SEQUENCE LISTING

<110> Qing Zhu
      Ju-Tao Guo
      Christoph Seeger

<120> Replication of Hepatitis C Virus in
   Non-Hepatic Epithelial and Mouse Hepatic Cells


<130> 0149-PO3068US1

<140> 10/536,955
<141> 2005-05-31

<150> PCT/US03/39722
<151> 2003-12-12

<150> 60/433,303
<151> 2002-12-13

<160> 16

<170> FastSEQ for Windows Version 3.0

<210> 1
<211> 11313
<212> DNA
<213> Artificial Sequence

<220>
<223> Plasmid

<400> 1
```
gccagccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg     60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac    120
cccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag    180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc    240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg    300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac    360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc    420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct    480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg    540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca    600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc    660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga    720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc    780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc    840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg    900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct    960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc   1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc   1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc   1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg   1200
gtttccctct agcgggatca attccgcccc tctccctccc ccccccctaa cgttactggc   1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg   1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct   1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca   1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgaccctttg caggcagcgg   1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct   1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa   1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt   1680
atgggatctg atctggggcc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa   1740
aacgtctagg ccccccgaac cacggggacg tggttttcct ttgaaaaaca cgataatacc   1800
```

```
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact   1860
agcctcacag gccgggacag gaaccaggtc gagggggagg tccaagtggt ctccaccgca   1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc   1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac   2040
caggacctcg tcggctggca agcgccccc ggggcgcgtt ccttgacacc atgcacctgc   2100
ggcagctcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg   2160
ggcgacagca gggggagcct actctccccc aggcccgtct cctacttgaa gggctcttcg   2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc   2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatgga aaccactatg   2340
cggtcccccg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg   2400
gcccatctac acgcccctac tggtagcggc aagagcacta aggtgccggc tgcgtatgca   2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg   2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc   2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc   2640
tctgggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact   2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg   2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg   2820
gctctgtcca gcactggaga atcccctttt tatggcaaag ccatccccat cgagaccatc   2880
aagggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg   2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc   3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc   3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc   3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg   3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga   3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt   3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca   3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc   3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac   3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac   3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gcccctgctg   3600
tataggtgtg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc   3660
atggcatgca tgtcggctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga   3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg   3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtccttta ccgggagttc   3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacagggaat gcagctcgcc   3900
gaacaattca aacagaaggc aatcggggtt ctgcaaacag ccaccaagca agcggaggct   3960
gctgctcccg tggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg   4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc   4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat   4140
accctcctgt ttaacatcct ggggggatgg gtggccgccc aacttgctcc tcccagcgct   4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg   4260
aaggtgcttg tggatatttt ggcaggggt tggcaggggg tggcaggcgc gctcgtgggc   4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct   4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac   4440
gtgggcccag gggaggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg   4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact   4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac   4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc   4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga   4740
gtccccttct tctcatgtca acgtgggtac aagggagtct ggcgggggcga cggcatcatg   4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg   4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac   4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctagggcgct gtggcgggtg   4980
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt tccactacgt gacgggcatg   5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg   5100
gatgggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc   5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa   5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg   5280
gctaagcgta ggctggccag gggatctccc cctccttgg ccagctcatc agctagccag   5340
ctgtctgcgc cttccttgaa ggcaacatgc actaccgtc atgactcccc ggacgctgac   5400
ctcatcgagg ccaacctcct gtggcggcag gagatgggcg ggaacatcac ccgcgtggag   5460
tcagaaaata aggtagtaat tttggactct ttcgagccgc tccaagcgga ggaggatgag   5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg   5580
cccatatggg cacgcccgga ttacaaccct ccactgttag agtcctggaa ggacccggac   5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccgatacca   5700
```

Page 2

```
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg    5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca    5820
acggcctctc ctgaccagcc ctccgacgac ggcgacgcgg gatccgacgt tgagtcgtac    5880
tcctccatgc cccccccttga gggggagccg ggggatcccg atctcagcga cgggtcttgg    5940
tctaccgtaa gcgaggaggc tagtgaggac gtcgtctgct gctcgatgtc ctacacatgg    6000
acaggcgcc tgatcacgcc atgcgctgcg gaggaaacca agctgcccat caatgcactg    6060
agcaactctt tgctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc    6120
ctgcggcaga agaaggtcac ctttgacaga ctgcaggtcc tggacgacca ctaccgggac    6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag    6240
gaagcctgta agctgacgcc cccacattcg gccagatcta aatttggcta tggggcaaag    6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg    6360
ctggaagaca ctgagacacc aattgacacc accatcatgg caaaaaatga ggttttctgc    6420
gtccaaccag agaaggggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg    6480
gttcgtgtgt gcgagaaaat ggccctttac gatgtggtct ccaccctccc tcaggccgtg    6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat    6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg ttttgactca    6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc    6720
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttacatcgg gggcccccctg    6780
actaattcta aagggcagaa ctgcgggtat cgccggtcgc gcgcgagcgg tgtactgacg    6840
accagctgcg gtaatacccct cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg    6900
aagctccagg actgcacgat gctcgtatgc ggagacgacc ttgtcgttat ctgtgaaagc    6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagatac    7020
tctgcccccc ctggggaccc gcccaaacca gaatacgact tggagttgat aacatcatgc    7080
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcacccgt    7140
gacccccacca cccccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat    7200
tcctggctag gcaacatcat catgtatgcg cccaccttgt gggcaaggat gatcctgatg    7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag    7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc    7380
catggcctta gcgcattttc actccatagt tactctccag gtgagatcaa tagggtggct    7440
tcatgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt    7500
gtccgcgcta ggctactgtc ccaggggggg agggctgcca cttgtgcaa gtacctcttc    7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtc ccagttggat    7620
ttatccagct ggttcgttgc tggttacagc ggggggagaca tatatcacag cctgtctcgt    7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtaggggt aggcatctat    7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt    7800
tttcctttt tttttttctt tttttttttt tttttttttt tttttttttt ttctcctttt    7860
ttttcctct tttttccctt ttctttcctt tggtggctcc atcttagccc tagtcacggc    7920
tagctgtgaa aggtccgtga gccgcttgac tgcagagagt gctgatactg gcctctctgc    7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcggggtatg ccgcgtttta    8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataagct ttaatgcggt    8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg    8160
ctcatcgtca tcctcggcac cgtcacccctg gatgctgtag gcataggctt ggttatgccg    8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc    8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg cacccgttct cggagcactg    8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac    8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccggacg catcgtggcc    8460
ggcatcaccg cgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg    8520
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca    8580
ggccccgtgg ccggggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg    8640
gcggtgctca acggcctcaa cctactactg gctgcttcc taatgcagga gtcgcataag    8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg    8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga    8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg    8880
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca agccttcgtc    8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc    9000
gacgcgctgg gctacgtctt gctggcgttc gcgacgcgag gctggatggc cttccccatt    9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcgt tgcaggccat gctgtccagg    9120
caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta    9180
acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg    9240
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt    9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg    9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa    9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca    9480
tctcgggcag cgttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga    9540
cccggctagg ctgcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc    9600
```

Page 3

```
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct    9660
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt    9720
tccggatctg catcgcagga tgctgctggc taccctgtgg aacacctaca tctgtattaa    9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc ccgccgcatc cataccgcca    9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta accgtatcg    9900
tgagcatcct ctctcgtttc atcggtatca ttacccccat gaacagaaat tcccccttac    9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag   10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga   10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt   10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca cagcttgtct   10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcgggtg   10260
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat   10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga   10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg   10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta   10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc   10560
aggaaccgta aaaaggccgc gttgctggcg tttttccata ggctccgccc ccctgacgag   10620
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac   10680
caggcgtttc cccctggaag ctccctcgtg cgctctcctg ttccgaccct gccgcttacc   10740
ggatacctgt ccgcctttct cccttcggga agcgtggcgc tttctcatag ctcacgctgt   10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaacccccc   10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga   10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta   10980
ggcggtgcta cagagttctt gaagtggtgg cctaactacg gctacactag aaggacagta   11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga   11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg   11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag   11220
tggaacgaaa actcacgtta agggattttg gtcatgagat tatcaaaaag gatcttcacc   11280
tagatccttt tctagataat acgactcact ata                                11313
```

```
<210> 2
<211> 11313
<212> DNA
<213> Artificial Sequence

<220>
<223> Plasmid

<400> 2
gccagccccc gattggggc gacactccac catagatcac tcccctgtga ggaactactg      60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac     120
ccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag      180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc     240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg     300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac     360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc     420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct     480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg     540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca     600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc     660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga     720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc     780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc     840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg     900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct     960
gcttgccgaa tatcatggtg aaaatggcc gcttttctgg attcatcgac tgtggccggc    1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc    1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc    1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg    1200
gtttccctct agcgggatca attccgcccc tctccctccc ccccctaa cgttactggc     1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg    1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct    1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca    1440
```

```
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgaccctttg caggcagcgg     1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct     1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa     1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt     1680
atgggatctg atctgggggcc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa     1740
aacgtctagg ccccccgaac cacggggacg tggtttttcct ttgaaaaaca cgataatacc     1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact     1860
agcctcacag gccgggacag gaaccaggtc gagggggagg tccaagtggt ctccaccgca     1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc     1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac     2040
caggacctcg tcggctggca agcgcccccc ggggcgcgtt ccttgacacc atgcacctgc     2100
ggcagctcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg     2160
ggcgacagca gggggagcct actctccccc aggcccgtct cctacttgaa gggctcttcg     2220
ggcggtccac tgctctgccc ctcgggggcac gctgtgggca tctttcgggc tgccgtgtgc     2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatgga aaccactatg     2340
cggtcccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg     2400
gcccatctac acgcccctac tggtagcggg aagagcacta aggtgccggc tgcgtatgca     2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg     2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc     2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc     2640
tctggggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact     2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg     2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg     2820
gctctgtcca gcactggaga aatcccctttt tatggcaaag ccatccccat cgagaccatc     2880
aaggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg     2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc     3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc     3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc     3120
ctggacccga cctccaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg     3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga     3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt     3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca     3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc     3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac     3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac     3540
caaatgtgga gtgtctcat acggctaaag cctacgctgc acgggccaac gccctgctg     3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc     3660
atggcatgca tgtcggctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga     3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg     3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtcctttta ccgggagttc     3840
gatgagatgg aagagtgcgc ctcacactc ccttacatcg aacagggaat gcagctcgcc     3900
gaacaattca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct     3960
gctgctcccg tggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg     4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc     4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat     4140
accctcctgt ttaacatcct ggggggatgg gtggccgccc aacttgctcc tccagcgct     4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg     4260
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc     4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct     4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac     4440
gtgggcccag gggaggggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg     4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact     4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac     4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc     4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga     4740
gtcccccttct tctcatgtca acgtgggtac aagggagtct ggcggggcga cggcatcatg     4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg     4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac     4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctagggcgct gtggcgggtg     4980
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt ccactacgt gacgggcatg     5040
accactgaca cgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg     5100
gatggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc     5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa     5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg     5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctatccag     5340
```

Page 5

```
ctgtctgcgc cttccttgaa ggcaacatgc actacccgtc atgactcccc ggacgctgac   5400
ctcatcgagg ccaacctcct gtggcggcag gagatgggcg ggaacatcac ccgcgtggag   5460
tcagaaaata aggtagtaat tttggagtct ttcgagccgc tccaagcgga ggaggatgag   5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg   5580
cccatatggg cacgcccgga ttacaaccct ccactgttag agtcctggaa ggacccggac   5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccgatacca   5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg   5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca   5820
acggcctctc ctgaccagcc ctccgacgac ggcgacgcgg gatccgacgt tgagtcgtac   5880
tcctccatgc cccccctttga gggggagccg ggggatcccg atctcagcga cgggtcttgg   5940
tctaccgtaa gcgaggaggc tagtgaggac gtcgtctgct gctcgatgtc ctacacatgg   6000
acaggcgccc tgatcacgcc atgcgctgcg gaggaaacca agctgcccat caatgcactg   6060
agcaactctt tgctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc   6120
ctgcggcaga agaaggtcac ctttgacaga ctgcaggtcc tggacgacca ctaccgggac   6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag   6240
gaagcctgta agctgacgcc cccacattcg gccagatcta aatttggcta tggggcaaag   6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg   6360
ctggaagaca ctgagacacc aattgacacc accatcatgg caaaaaatga ggttttctgc   6420
gtccaaccag agaaggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg   6480
gttcgtgtgt gcgagaaaat ggccctttac gatgtggtct ccaccctccc tcaggccgtg   6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat   6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg ttttgactca   6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc   6720
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttacatcgg gggcccctg   6780
actaattcta aagggcagaa ctgcggctat cgccggtgcc gcgcgagcgg tgtactgacg   6840
accagctgcg gtaatacct cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg   6900
aagctccagg actgcacgat gctcgtatgc ggagacgacc ttgtcgttat ctgtgaaagc   6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagatac   7020
tctgcccccc ctggggaccc gcccaaacca gaatacgact tggagttgat aacatcatgc   7080
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcaccgt   7140
gaccccacca ccccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat   7200
tcctggctag gcaacatcat catgtatgcg cccaccttgt gggcaaggat gatcctgatg   7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag   7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc   7380
catggcctta gcgcattttc actccatagt tactctccag gtgagatcaa tagggtggct   7440
tcatgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt   7500
gtccgcgcta ggctactgtc ccagggggg agggctgcca cttgtggcaa gtacctcttc   7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtc ccagttggat   7620
ttatccagct ggttcgttgc tggttacagc gggggagaca tatatcacag cctgtctcgt   7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtaggggt aggcatctat   7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt   7800
tttcccttttt ttttttttctt tttttttttt ttttttttttt ttttttttttt ttctcctttt   7860
tttttcctct ttttttcctt ttctttcctt tggtggctcc atcttagccc tagtcacggc   7920
tagctgtgaa aggtccgtga ccgcttgac tgcagagagt gctgatactg gcctctctgc   7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcggggtatg ccgcgtttta   8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataagct ttaatgcggt   8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg   8160
ctcatcgtca tcctcggcac cgtcaccctg gatgctgtag gcataggctt ggttatgccg   8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc   8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg cacccgttct cggagcactg   8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac   8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccggacg catcgtggcc   8460
ggcatcaccg gcgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg   8520
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca   8580
ggccccgtgg ccggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg   8640
gcggtgctca acggcctcaa cctactactg gctgcttcc taatgcagga gtcgcataag   8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg   8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga   8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg agcgcgacg   8880
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca agccttcgtc   8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc   9000
gacgcgctgg gctacgtctt gctggcgttc gcgacgcgag gctggatggc cttccccatt   9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcgt tgcaggccat gctgtccagg   9120
caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta   9180
acttcgatca ctggaccgct gatcgtcacg cgatttatg ccgcctcggc gagcacatgg   9240
```

Page 6

```
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt    9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg    9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa    9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca    9480
tctcgggcag cgttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga    9540
cccggctagg ctggcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc    9600
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct    9660
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt    9720
tccggatctg catcgcagga tgctgctggc taccctgtgg aacacctaca tctgtattaa    9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc ccgccgcatc cataccgcca    9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta acccgtatcg    9900
tgagcatcct ctctcgtttc atcggtatca ttaccccat gaacagaaat tccccttac      9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag   10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga   10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt   10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca cagcttgtct   10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcgggtg   10260
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat   10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga   10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg   10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta   10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc   10560
aggaaccgta aaaaggccgc gttgctggcg tttttccata ggctccgccc ccctgacgag   10620
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac   10680
caggcgtttc cccctggaag ctccctcgtg cgctctcctg ttccgaccct gccgcttacc   10740
ggatacctgt ccgcctttct cccttcggga agcgtggcgc tttctcatag ctcacgctgt   10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaaccccc    10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga   10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta   10980
ggcggtgcta cagagttctt gaagtggtgg cctaactacg gctacactag aaggacagta   11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga   11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg   11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag   11220
tggaacgaaa actcacgtta agggattttg gtcatgagat tatcaaaaag gatcttcacc   11280
tagatccttt tctagataat acgactcact ata                                11313
```

```
    <210> 3
    <211> 11313
    <212> DNA
    <213> Artificial Sequence

    <220>
    <223> Plasmid

    <400> 3
    gccagccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg      60
    tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac     120
    ccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag      180
    gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc     240
    gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg     300
    gtgcttgcga gtgcccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac    360
    ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc     420
    cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct     480
    ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg     540
    acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca    600
    cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc     660
    tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga    720
    aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg ctacctgcc     780
    cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc     840
    ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg    900
    ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct     960
    gcttgccgaa tatcatggtg aaaatggcc gcttttctgg attcatcgac tgtggccggc     1020
    tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc    1080
```
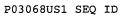
Page 7

```
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc     1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg     1200
gtttccctct agcgggatca attccgcccc tctccctccc cccccccctaa cgttactggc     1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg     1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct     1380
agggggtcttt ccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca     1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgaccctttg caggcagcgg     1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct     1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa     1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt     1680
atgggatctg atctgggggcc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa     1740
aacgtctagg cccccgaac cacggggacg tggtttcct ttgaaaaaca cgataatacc     1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact     1860
agcctcacag gccgggacag gaaccaggtc gagggggagg tccaagtggt ctccaccgca     1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc     1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac     2040
caggacctcg tcggctggca agcgcccccc ggggcgcgtt ccttgacacc atgcacctgc     2100
ggcagctcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg     2160
ggcgacagca gggggagcct actctccccc aggcccgtct cctacttgaa gggctcttcg     2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc     2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatgga aaccactatg     2340
cggtcccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg     2400
gcccatctac acgccctac tggtagcggc aagagcacta aggtgccggc tgcgtatgca     2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg     2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc     2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc     2640
tctgggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact     2700
atcctgggca tcggcacagt cctggaccaa gcgggagacg ctggagcgcg actcgtcgtg     2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg     2820
gctctgtcca gcactggaga atccccttt tatggcaaag ccatccccat cgagaccatc     2880
aagggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg     2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc     3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc     3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc     3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg     3180
cagcggcgag gcaggactgg tagggggcagg atgggcattt acaggtttgt gactccagga     3240
gaacggcct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt     3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca     3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc     3420
acccacatag acgccccattt cttgtcccag actaagcagg caggagacaa cttcccctac     3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac     3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gcccctgctg     3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc     3660
atggcatgca tgtcagctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga     3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg     3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtctttta ccgggagttc     3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacggggaat gcagctcgcc     3900
gaacatttca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct     3960
gctgctcccg cggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg     4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc     4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat     4140
accctcctgt ttaacatcct gggggatggg gtgggccgcc aacttgctcc tcccagcgct     4200
gcttctgctt cgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg     4260
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc     4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct     4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac     4440
gtgggcccag gggaggggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg     4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact     4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac     4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc     4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga     4740
gtccccttct tctcatgtca acgtgggtac aagggagtct ggcggggcga cggcatcatg     4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg     4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac     4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctaggcgcct gtggcgggtg     4980
```

```
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt tccactacgt gacgggcatg    5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg    5100
gatggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc    5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa    5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg    5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctatccag    5340
ctgtctgcgc cttccttgaa ggcaacatgc actacccgtc atgactcccc ggacgctgac    5400
ctcatcgagg ccaacctcct gtggcggcag gagatggggcg ggaacatcac ccgcgtggag    5460
tcagaaaata aggtagtaat tttggagtct ttcgagccgc tccaagcgga ggaggatgag    5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg    5580
cccatatggg cacgcccgga ttacaaccct ccactgttag agtcctggaa ggacccggac    5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccgatacca    5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg    5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca    5820
acggcctctc ctgaccagcc ctccgacgac ggcgacgcgg gatccgacgt tgagtcgtac    5880
tcctccatgc ccccccttga ggggggaccg ggggatcccg atctcagcga cgggtcttgg    5940
tctaccgtaa gcgaggaggc tagtgaggac gtcgtctgct gctcgatgtc ctacacatgg    6000
acaggcgccc tgatcacgcc atgcgctgcg gaggaaacca agctgcccat caatgcactg    6060
agcaactctt tgctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc    6120
ctgcggcaga agaaggtcac ctttgacaga ctgcaggtcc tggacgacca ctaccgggac    6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag    6240
gaagcctgta agctgacgcc cccacattcg gccagatcta aatttggcta tggggcaaag    6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg    6360
ctggaagaca ctgagacacc aattgacacc accatcatgg caaaaaatga ggttttctgc    6420
gtccaaccag agaagggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg    6480
gttcgtgtgt gcgagaaaat ggccctttac gatgtggtct ccaccctccc tcaggccgtg    6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat    6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg ttttgactca    6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc    6720
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttacatcgg gggccccctg    6780
actaattcta aagggcagaa ctgcggctat cgccggtgcc gcgcgagcgg tgtactgacg    6840
accagctgcg gtaatacccc cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg    6900
aagctccagg actgcacgat gctcgtatgc ggagacgacc ttgtcgttat ctgtgaaagc    6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagagac    7020
tctgcccccc ctggggaccc gcccaaacca gaatacgact tggagttgat aacatcatgc    7080
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcacccgt    7140
gaccccacca cccccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat    7200
tcctggctag gcaacatcat catgtatgcg cccaccttgt gggcaaggat gatcctgatg    7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag    7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc    7380
catggcctta gcgcattttc actctagt tactctccag gtgagatcaa tagggtggct    7440
tcatgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt    7500
gtccgcgcta ggctactgtc ccagggggggg agggctgcca cttgtggcaa gtacctcttc    7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtc ccagttggat    7620
ttatccagct ggttcgttgc tggttacagc gggggagaca tatatcacag cctgtctcgt    7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtaggggt aggcatctat    7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt    7800
tttcctttt ttttttctt tttttttttt tttttttttt tttttttttt ttctcctttt    7860
ttttcctct ttttttcctt ttctttcctt tggtggctcc atcttagccc tagtcacggc    7920
tagctgtgaa aggtccgtga gccgcttgac tgcagagagt gctgatactg gcctctctgc    7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcggggtatg ccgcgtttta    8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataagct ttaatgcggt    8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg    8160
ctcatcgtca tcctcggcac cgtcaccctg gatgctgtag gcataggctt ggttatgccg    8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc    8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg cacccgttct cggagcactg    8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac    8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccggacg catcgtggcc    8460
ggcatcaccg cgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg    8520
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca    8580
ggccccgtgg ccgggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg    8640
gcggtgctca acggcctcaa cctactactg ggctgcttcc taatgcagga gtcgcataag    8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg    8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga    8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg    8880
```

```
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca agccttcgtc    8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc    9000
gacgcgctgg gctacgtctt gctggcgttc gacgcgcgag gctggatggc cttccccatt    9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcgt tgcaggccat gctgtccagg    9120
cagg͟tagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta    9180
acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg    9240
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt    9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg    9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa    9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca    9480
tctcgggcag cgttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga    9540
cccggctagg ctggcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc    9600
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct    9660
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt    9720
tccggatctg catcgcagga tgctgctggc taccctgtgg aacacctaca tctgtattaa    9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc ccgccgcatc cataccgcca    9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta acccgtatcg    9900
tgagcatcct ctctcgtttc atcggtatca ttacccccat gaacagaaat tccccccttac   9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag   10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga   10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt   10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca cagcttgtct   10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcgggtg   10260
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat   10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga   10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg   10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta   10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc   10560
aggaaccgta aaaaggccgc gttgctggcg tttttccata ggctccgccc ccctgacgag   10620
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac   10680
caggcgtttc cccctggaag ctccctcgtg cgctctcctg ttccgaccct gccgcttacc   10740
ggatacctgt ccgcctttct cccttcggga agcgtggcgc tttctcatag ctcacgctgt   10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaaccccccc  10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga   10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta   10980
ggcggtgcta cagagttctt gaagtggtgg cctaactacg gctacactag aaggacagta   11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga   11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg   11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag   11220
tggaacgaaa actcacgtta agggattttg gtcatgagat tatcaaaaag gatcttcacc   11280
tagatccttt tctagataat acgactcact ata                                11313
```

```
<210> 4
<211> 11313
<212> DNA
<213> Artificial Sequence

<220>
<223> Plasmid

<400> 4
gccagccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg     60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac    120
cccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag    180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc    240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg    300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac    360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc    420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct    480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg    540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca    600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc    660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga    720
```

```
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc      780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc      840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg      900
ccaggctcaa ggcgcgcatg cccgacgacg aggatctcgt cgtgacccat ggcgatgcct      960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc     1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc     1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc     1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg     1200
gtttccctct agcgggatca attccgcccc tctccctccc ccccccctaa cgttactggc     1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg     1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct     1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca     1440
gttcctctgg aagcttcttg aagacaaaca cgtctgtag cgaccctttg caggcagcgg     1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct     1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa     1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt     1680
atgggatctg atctgggggc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa     1740
aacgtctagg ccccccgaac cacggggacg tggttttcct ttgaaaaaca cgataatacc     1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact     1860
agcctcacag gccgggacag gaaccaggtc gagggggagg tccaagtggt ctccaccgca     1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc     1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac     2040
caggacctcg tcggctggca agcgccccc ggggcgcgtt ccttgacacc atgcacctgc     2100
ggcagcgcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg     2160
ggcgacagca gggggagcct actctccccc aggcccgttt cctacttgaa gggctcttcg     2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc     2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatggg aaccactatg     2340
cggtccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg     2400
gcccatctac acgcccctac tggtagcggc aagagcacta aggtgccggc tgcgtatgca     2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg     2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc     2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc     2640
tctggggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact     2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg     2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg     2820
gctctgtcca gcactggaga atccccttt tatggcaaag ccatccccat cgagaccatc     2880
aagggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg     2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc     3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc     3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc     3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg     3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga     3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt     3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca     3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc     3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac     3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac     3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gcccctgctg     3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc     3660
atggcatgca tgtcagctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga     3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg     3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtctttta cggggagttc     3840
gatgagatgg aagagtgcgc ctcacactcc ccttacatcg aacggggaat gcagctcgcc     3900
gaacatttca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct     3960
gctgctcccc cggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg     4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc     4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat     4140
accctcctgt ttaacatcct ggggggatgg gtggccgccc aacttgctcc tcccagcgct     4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg     4260
aaggtgcttg tggatattt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc     4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct     4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac     4440
gtgggcccag gggaggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg     4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact     4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac     4620
```

Page 11

```
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc    4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga    4740
gtccccttct tctcatgtca acgtggggtac aagggagtct ggcggggcga cggcatcatg    4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg    4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac    4920
accacgggcc cctgcacgcc ctccccggcc ccaaattatt ctagggcgct gtggcgggtg    4980
gctgctgagg agtacgtgga ggttacgcgg gtggggggatt tccactacgt gacgggcatg    5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg    5100
gatggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc    5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa    5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg    5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctatccag    5340
ctgtctgcgc cttccttgaa ggcaacatgc actaccgtc atgactcccc ggacgctgac      5400
ctcatcgagg ccaacctcct gtggcggcag gagatggggcg ggaacatcac ccgcgtggag    5460
tcagaaaata aggtagtaat tttggagtct ttcgagccgc tccaagcgga ggaggatgaa    5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg    5580
cccatatggg cacgcccgga ttacaaccct ccactgttag agtcctggaa ggacccggac    5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccgatacca    5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg    5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca    5820
acggcctctc ctgaccagcc ctccgacgac ggcgacgcgg gatccgacgt tgagtcgtac    5880
tcctccatgc cccccccttga gggggagccg ggggatcccg atctcagcga cgggtcttgg    5940
tctaccgtaa gcgaggaggc tagtgaggac gtcgtctgct gctcgatgtc ctacacatgg    6000
acaggcgccc tgatcacgcc atgcgctgcg gaggaaacca agctgcccat caatgcactg    6060
agcaactctt tgctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc    6120
ctgcggcaga agaaggtcac ctttgacaga ctgcaggtcc tggacgacca ctaccgggac    6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag    6240
gaagcctgta agctgacgcc cccacattcg gccagatcta aatttggcta tggggtcaaag    6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg    6360
ctggaagaca ctgagacacc aattgacacc accatcatgg caaaaaatga ggttttctgc    6420
gtccaaccag agaagggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg    6480
gttcgtgtgt gcgagaaaat ggccctttac gatgtggtct ccaccctccc tcaggccgtg    6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat    6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg ttttgactca    6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc    6720
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttacatcgg gggcccccctg    6780
actaattcta aagggcagaa ctgcggctat cgccggtgcc gcgcgagcgg tgtactgacg    6840
accagctgcg gtaatacccct cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg    6900
aagctccagg actgcacgat gctcgtatgc ggagacgacc ttgtcgttat ctgtgaaagc    6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagatac    7020
tctgcccccc ctgggggaccc gcccaaacca gaatacgact tggagttgat aacatcatgc    7080
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcacccgt    7140
gaccccacca cccccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat    7200
tcctggctag gcaacatcat catgtatgcg cccaccttgt gggcaaggat gatcctgatg    7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag    7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc    7380
catggcctta gcgcattttc actccatagt tactctccag gtgagatcaa tagggtggct    7440
tcatgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt    7500
gtccgcgcta ggctactgtc ccaggggggg agggctgcca cttgtggcaa gtacctcttc    7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtc ccagttggat    7620
ttatccagct ggttcgttgc tggttacagc gggggagaca tatatcacag cctgtctcgt    7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtaggggt aggcatctat    7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt    7800
tttccctttt tttttttctt tttttttttt tttttttttt ttttttttt ttctcctttt    7860
tttttcctct ttttttcctt ttctttcctt tggtggctcc atcttagccc tagtcacggc    7920
tagctgtgaa aggtccgtga ccgcttgac tgcagagagt gctgatactg gcctctctgc      7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcggggtatg ccgcgtttta    8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataagct ttaatgcggt    8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg    8160
ctcatcgtca tcctcggcac cgtcaccctg gatgctgtag gcataggctt ggttatgccg    8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc    8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg cacccgttct cggagcactg    8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac    8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccggacg catcgtggcc    8460
ggcatcaccg cgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg     8520
```

Page 12

```
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca     8580
ggccccgtgg ccggggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg     8640
gcggtgctca acggcctcaa cctactactg ggctgcttcc taatgcagga gtcgcataag     8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg     8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga     8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg     8880
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca agccttcgtc     8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc     9000
gacgcgctgg gctacgtctt gctggcgttc gcgacgcgag gctggatggc cttccccatt     9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcgt tgcaggccat gctgtccagg     9120
caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta     9180
acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg     9240
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt     9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg     9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa     9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca     9480
tctcgggcag cgttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga     9540
cccggctagg ctggcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc     9600
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct     9660
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt     9720
tccggatctg catcgcagga tgctgctggc taccctgtgg aacacctaca tctgtattaa     9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc ccgccgcatc cataccgcca     9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta acccgtatcg     9900
tgagcatcct ctctcgtttc atcggtatca ttacccccat gaacagaaat tccccctttac     9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag    10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga    10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt    10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca gcgttgtct     10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcggggtg    10260
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat    10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga    10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg    10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta    10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc    10560
aggaaccgta aaaaggccgc gttgctggcg tttttccata ggctccgccc cctgacgag     10620
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac    10680
caggcgtttc ccctggaag ctccctcgtg cgctctcctg ttccgaccct gccgcttacc     10740
ggatacctgt ccgcctttct cccttcggga agcgtggcgc tttctcatag ctcacgctgt    10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaaccccccc    10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga    10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta    10980
ggcggtgcta cagagttctt gaagtggtgg cctaactacg gctacactag aaggacagta    11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga    11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg    11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag    11220
tggaacgaaa actcacgtta agggattttg gtcatgagat tatcaaaaag gatcttcacc    11280
tagatccttt tctagataat acgactcact ata                                 11313
```

```
<210> 5
<211> 11313
<212> DNA
<213> Artificial Sequence

<220>
<223> Plasmid

<400> 5
gccagcccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg       60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac      120
cccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag      180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgcccccc    240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg      300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac      360
```

Page 13

```
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc    420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct    480
ctgatgccgc cgtgttccgg ctgtcagcga ggggcgcccc ggttcttttt gtcaagaccg    540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca    600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc    660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga    720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc    780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc    840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg    900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct    960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc   1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc   1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc   1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg   1200
gtttccctct agcgggatca attccgcccc tctccctccc cccccctaa cgttactggc   1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg   1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct   1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca   1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgaccctttg caggcagcgg   1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct   1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa   1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt   1680
atgggatctg atctggggcc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa   1740
aacgtctagg ccccccgaac cacggggacg tggttttcct ttgaaaaaca cgataatacc   1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact   1860
agcctcacag gccgggacag gaaccaggtc gagggggagg tccaagtggt ctccaccgca   1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtggc   1980
ggctcaaaga cccttgccgg cccaaagggc caatcaccc aaatgtacac caatggcgac   2040
caggacctcg tcggctggca agcgcccccc ggggcgcgtt ccttgacacc atgcacctgc   2100
ggcagctcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg   2160
ggcgacagca ggggagcct actctccccc aggcccgtct cctacttgaa gggctcttcg   2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc   2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatggg aaccactatg   2340
cggtcccccg gtcttacgga caactcgtcc cctccggccg taccgcagac attccaggtg   2400
gcccatctac acgcccctac tggtagcggc aagagcacta aggtgccggc tgcgtatgca   2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg   2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc   2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc   2640
tctggggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact   2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagacag actcgtcgtg   2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg   2820
gctctgtcca gcactggaga aatccccttt tatggcaaag ccatccccat cgagaccatc   2880
aagggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg   2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc   3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc   3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc   3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg   3180
cagcggcgag gcaggactgg tagggggcagg atgggcattt acaggtttgt gactccagga   3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt   3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca   3360
ccagggttgc cgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc   3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac   3480
ctggtagcat accaggctac ggtgtgcgcc agggtcagg ctccacctcc atcgtgggac   3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gcccctgctg   3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc   3660
atggcatgca tgtcagctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga   3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg   3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtctttta ccgggagttc   3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacggggaat gcagctcgcc   3900
gaacatttca aacagaaggc aatcggggttg ctgcaaacag ccaccaagca agcggaggct   3960
gctgctcccg cggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg   4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc   4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat   4140
accctcctgt ttaacatcct ggggggatgg gtggccgccc aacttgctcc tcccagcgct   4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg   4260
```

Page 14

```
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc    4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct    4380
atcctctccc ctggcgccct agtcgtgggg gtcgtgtgcg cagcgatact gcgtcggcac    4440
gtgggcccag gggagggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg    4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact    4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac    4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc    4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga    4740
gtccccttct tctcatgtca acgtgggtac aagggagtct ggcggggcga cggcatcatg    4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg    4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac    4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctagggcgct gtggcgggtg    4980
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt tccactacgt gacgggcatg    5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg    5100
gatggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc    5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa    5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg    5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctatccag    5340
ctgtctgcgc cttccttgaa ggcaacatgc actaccgtc atgactcccc ggacgctgac    5400
ctcatcgagg ccaacctcct gtggcggcag gagatgggcg ggaacatcac ccgcgtggag    5460
tcagaaaata aggtagtaat tttggagtct ttcgagccgc tccaagcgga ggaggatgag    5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg    5580
cccatatggg cacgcccgga ttacaaccct ccactgttag agtcctggaa ggacccggac    5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccgatacca    5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg    5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca    5820
acggcctctc ctgaccagcc ctccgacgac ggcgacgcgg gatccgacgt tgagtcgtac    5880
tcctccatgc cccccccttga gggggagccg gggcaccccg atctcagcga cgggtcttgg    5940
tctaccgtaa gcgaggaggac tagtgaggac gtcgtctgct gctcgatgtc ctacacatgg    6000
acaggcgccc tgatcacgcc atgcgctgcg gaggaaacca agctgcccat caatgcactg    6060
agcaactctt tgctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc    6120
ctgcggcaga agaaggtcac ctttgacaga ctgcaggtcc tggacgacca ctaccgggac    6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag    6240
gaagcctgta agctgacgcc cccacattcg gccagatcta aatttggcta tggggcaaag    6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg    6360
ctggaagaca ctgagacacc aattgacacc accatcatgg caaaaaatga ggttttctgc    6420
gtccaaccag agaaggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg    6480
gttcgtgtgt gcgagaaaat ggccctttac gatgtggtct ccaccctccc tcaggccgtg    6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat    6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg ttttgactca    6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc    6720
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttacatcgg gggcccctg    6780
actaattcta aagggcagaa ctgcggctat cgccggtgcc gcgcgagcgg tgtactgacg    6840
accagctgcg gtaataccct cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg    6900
aagctccagg actgcacgat gctcgtatgc ggagacgacc ttgtcgttat ctgtgaaagc    6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagatac    7020
tctgcccccc ctggggaccc gcccaaacca gaatacgact tggagttgat aacatcatgc    7080
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcacccgt    7140
gaccccacca cccccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat    7200
tcctggctag caacatcat catgtatgcg cccaccttgt gggcaaggat gatcctgatg    7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag    7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc    7380
catggcctca gcgcatttc actccatagt tactctccag gtgagatcaa tagggtggct    7440
tcatgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt    7500
gtccgcgcta ggctactgtc ccaggggggg agggctgcca cttgtggcaa gtacctcttc    7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtc ccagttggat    7620
ttatccagct ggttcgttgc tggttacagc ggggagaca tatatcacag cctgtctcgt    7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtaggggt aggcatctat    7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt    7800
tttccttttt tttttttctt ttttttttt ttttttttt ttttttttt ttctcctttt    7860
ttttcctct tttttccctt ttctttcctt tggtggctcc atcttagccc tagtcacggc    7920
tagctgtgaa aggtccgtga ccgcttgac tgcagagagt gctgatactg gcctctctgc    7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcggggtatg ccgcgtttta    8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataagct ttaatgcggt    8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg    8160
```

Page 15

```
ctcatcgtca tcctcggcac cgtcaccctg gatgctgtag gcataggctt ggttatgccg    8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc    8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg cacccgttct cggagcactg    8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac    8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccggacg catcgtggcc    8460
ggcatcaccg gcgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg    8520
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca    8580
ggccccgtgg ccggggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg    8640
gcggtgctca acggcctcaa cctactactg ggctgcttcc taatgcagga gtcgcataag    8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg    8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga    8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg    8880
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca gccttcgtc     8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc    9000
gacgcgctgg gctacgtctt gctggcgttc gcgacgcgag gctggatggc cttccccatt    9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcgt tgcaggccat gctgtccagg    9120
caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta    9180
acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg    9240
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt    9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg    9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa    9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca    9480
tctcgggcag cgttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga    9540
cccggctagg ctggcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc    9600
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct    9660
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt    9720
tccggatctg catcgcagga tgctgctggc taccctgtgg aacacctaca tctgtattaa    9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc ccgccgcatc cataccgcca    9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta acccgtatcg    9900
tgagcatcct ctctcgtttc atcggtatca ttacccccat gaacagaaat tcccccttac    9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag   10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga   10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt   10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca cagcttgtct   10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcgggtg   10260
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat   10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga   10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg   10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta   10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc   10560
aggaaccgta aaaaggccgc gttgctggcg tttttccata ggctccgccc ccctgacgag   10620
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac   10680
caggcgtttc cccctggaag ctccctcgtg cgctctcctg ttccgaccct gccgcttacc   10740
ggatacctgt ccgcctttct cccttcggga agcgtggcgc tttctcatag ctcacgctgt   10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaacccccc   10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga   10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta   10980
ggcggtgcta cagagttctt gaagtggtgg cctaactacg gctacactag aaggacagta   11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga   11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg   11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag   11220
tggaacgaaa actcacgtta agggattttg gtcatgagat tatcaaaaag gatcttcacc   11280
tagatccttt tctagataat acgactcact ata                                11313
```

```
<210> 6
<211> 11313
<212> DNA
<213> Artificial Sequence

<220>
<223> Plasmid

<400> 6
```

```
gccagccccc gattggggge gacactccac catagatcac tccctgtga ggaactactg        60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac       120
ccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag        180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc       240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg       300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac       360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc       420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct       480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg       540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca       600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc       660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga       720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc       780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc       840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg       900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct       960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc      1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc      1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc      1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg      1200
gtttccctct agcgggatca attccgcccc tctccctccc cccccctaa cgttactggc       1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg      1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct      1380
aggggtcttt ccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca       1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgacccttg caggcagcgg        1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct      1560
gcaaaggcgg cacaacccca gtgccacggt gtgagtgga gtagttgtgga aagagtcaaa       1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt      1680
atgggatctg atctgggggc cteggtgcaca tgctttacat gtgtttagtc gaggttaaaa      1740
aacgtctagg cccccccgaac cacggggacg tggttttcct ttgaaaaaca cgataatacc     1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact      1860
agcctcacag gccgggacag gaaccaggtc gaggggggagg tccaagtggt ctccaccgca      1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc      1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac      2040
caggacctcg tcggctggca agcgcccccc ggggcgcgtt ccttgacacc atgcacctgc      2100
ggcagcgcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg      2160
ggcgacagca gggggagcct actctccccc aggcccgttt cctacttgaa gggctcttcg      2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc      2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatggg aaccactatg      2340
cggtccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg      2400
gcccatctac acgcccctac tggtagcggg aagagcacta aggtgccggc tgcgtatgca      2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg      2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc      2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc      2640
tctgggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact      2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg      2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg      2820
gctctgtcca gcactggaga aatccccttt tatggcaaag ccatccccat cgagaccatc      2880
aagggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg      2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc      3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc      3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc      3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg      3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga      3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt      3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca      3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc      3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac      3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac      3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gcccctgctg      3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc      3660
atggcatgca tgtcagctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga      3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg      3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtctttta ccgggagttc      3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacggggaat gcagctcgcc      3900
```

```
gaacatttca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct    3960
gctgctcccg cggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg    4020
tggaatttca tcagcgggat acaatagtta gcaggcttgt ccactctgcc tggcaacccc    4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat    4140
accctcctgt ttaacatcct gggggggatg gtggccgccc aacttgctcc tcccagcgct    4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg    4260
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc    4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct    4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac    4440
gtgggcccag gggagggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg    4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact    4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac    4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc    4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga    4740
gtccccttct tctcatgtca acgtgggtac aagggagtct ggcggggcga cggcatcatg    4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg    4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac    4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctagggcgct gtggcgggtg    4980
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt tccactacgt gacgggcatg    5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg    5100
gatggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc    5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa    5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg    5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctatccag    5340
ctgtctgcgc cttccttgaa ggcaacatgc actaccgtc atgactcccc ggacgctgac     5400
ctcatcgagg ccaacctcct gtggcggcag gagatggggcg ggaacatcac ccgcgtggag    5460
tcagaaaata aggtagtaat tttggagtct ttcgagccgc tccaagcgga ggaggatgag    5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg    5580
cccatatggg cacgcccgga ttacaacctc ccactgttag agtcctggag ggacccggac    5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccggtacca    5700
cctccacgga ggaagaggac ggttgtcctg ccagaatcta ccgtgtcttc cgccctggcg    5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca    5820
acggcctctc ctgactagcc ctccaacgac ggcgacgcgg gatccgacgt tgagtcgtac    5880
tcccccatgc cccccttga gggggagccg ggggatcccg attccagcga cgggtcttgg    5940
tctaccgtaa gcgaggggggt tagtgaggac gtcgtctgct gctcgatgtc ctacacatgg    6000
acaggcgccc tgatcacgcc atgcgctgcg gaggaaacca agctgcccat caatgcactg    6060
agcaactctt tgctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc    6120
ctgcggcaga agaaggtcac ctttgacaga ctgcaggtcc tggacgacca ctaccgggac    6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag    6240
gaagcctgta agctgacgcc cccacattcg gccagatcta aatttggctc tggggcaaag    6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg    6360
ctggaagaca ctgagacacc accatcatgg caaaaaatga ggttttctgc                6420
gtccaaccag agaagggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg    6480
gttcgtgtgt gcgagaaaat ggccctttac gatgtggtct ccaccctccc tcaggccgtg    6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat    6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg ttttgactca    6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc    6720
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttacatcgg gggcccctg     6780
actaattcta aagggcagaa ctgcggctat cgccggtgcc gcgcgagcgg tgtactgacg    6840
accagctgcg gtaataccct cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg    6900
aagctccagg actgcacgat gctcgtatgc ggagacgacc ttgtcgttat ctgtgaaagc    6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagatac    7020
tctgcccccc ctgggggaccc gcccaaacca gaatacgact tggagttgat aacatcatgc    7080
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcacccgt    7140
gacccaccca cccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat    7200
tcctggctag gcaacatcat catgtatgcg cccaccttgt gggcaaggat gatcctgatg    7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag    7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc    7380
catggcctta gcgcattttc actccatagt tactctccag gtgagatcaa tagggtggct    7440
tcatgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt    7500
gtccgcgcta ggctactgtc caggggggg agggctgcca cttgtggcaa gtacctcttc    7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtc ccagttggat    7620
ttatccagct ggttcgttgc tggttacagc gggggagaca tatatcacag cctgtctcgt    7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtagggt aggcatctat     7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt    7800
```

<div align="center">Page 18</div>

```
tttcccttttt ttttttttctt ttttttttttt ttttttttttt ttttttttttt ttctcctttt    7860
ttttttcctct ttttttcctt ttctttccttt tggtggctcc atcttagccc tagtcacggc    7920
tagctgtgaa aggtccgtga gccgcttgac tgcagagagt gctgatactg gcctctctgc    7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcggggtatg ccgcgtttta    8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataaget ttaatgcggt    8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg    8160
ctcatcgtca tcctcggcac cgtcaccctg gatgctgtag gcataggctt ggttatgccg    8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc    8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg cacccgttct cggagcactg    8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac    8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccggacg catcgtggcc    8460
ggcatcaccg gcgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg    8520
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca    8580
ggccccgtgg ccggggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg    8640
gcggtgctca acggcctcaa cctactactg ggctgcttcc taatgcagga gtcgcataag    8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg    8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga    8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg    8880
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca agccttcgtc    8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc    9000
gacgcgctgg gctacgtctt gctggcgttc gcgacgcgag gctggatggc cttccccatt    9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcgt tgcaggccat gctgtccagg    9120
caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta    9180
acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg    9240
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt    9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg    9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa    9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca    9480
tctcgggcag cgttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga    9540
cccggctagg ctggcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc    9600
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct    9660
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt    9720
tccggatctg catcgcagga tgctgctggc taccctgtgg aacacctaca tctgtattaa    9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc ccgccgcatc cataccgcca    9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta acccgtatcg    9900
tgagcatcct ctctcgtttc atcggtatca ttacccccat gaacagaaat tcccccttac    9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag   10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga   10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt   10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca gcgttgtct   10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcggggt   10260
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat   10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga   10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg   10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta   10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc   10560
aggaaccgta aaaaggccgc gttgctggcg ttttttccata ggctccgccc ccctgacgag   10620
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac   10680
caggcgtttc ccctggaag ctccctcgtg cgctctcctg ttccgaccct gccgcttacc   10740
ggatacctgt ccgcctttct cccttcggga agcgtggcgc tttctcatag ctcacgctgt   10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaaccccccc   10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga   10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta   10980
ggcggtgcta cagagttctt gaagtggtgg cctaactacg gctacactag aaggacagta   11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga   11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg   11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag   11220
tggaacgaaa actcacgtta agggattttg gtcatgagat tatcaaaaag gatcttcacc   11280
tagatccttt tctagataat acgactcact ata   11313
```

&lt;210&gt; 7
&lt;211&gt; 11313
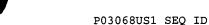&lt;212&gt; DNA

Page 19

<213> Artificial Sequence

<220>
<223> Plasmid

<400> 7
```
gccagccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg      60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac     120
cccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag     180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc     240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg     300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac     360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc     420
cggccgcttg gtggagagg  ctattcggct atgactgggc acaacagaca atcggctgct     480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg     540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca     600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc     660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga     720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc     780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc     840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg     900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct     960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc    1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc    1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc    1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg    1200
gtttccctct agcgggatca attccgcccc tctccctccc ccccctaa cgttactggc      1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg    1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct    1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca    1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgaccctttg caggcagcgg    1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct    1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa    1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt    1680
atgggatctg atctggggcc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa    1740
aacgtctagg cccccgaac  cacggggacg tggttttcct ttgaaaaaca cgataatacc    1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact    1860
agcctcacag gccgggacag gaaccaggtc gaggggg agg tccaagtggt ctccaccgca    1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc    1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac    2040
caggacctcg tcggctggca agcgcccccc ggggcgcgtt ccttgacacc atgcacctgc    2100
ggcagcgcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg    2160
ggcgacagca gggggagcct actctccccc aggcccgttt cctacttgaa gggctcttcg    2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc    2280
acccgagggg ttgcgaaggc ggtggacttt gtaccgtcg  agtctatggg aaccactatg    2340
cggtccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg    2400
gcccatctac acgcccctac tggtagcggc aagagcacta aggtgccggc tgcgtatgca    2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg    2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc    2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc    2640
tctggggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact    2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg    2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccat atccaaacat cgaggaggtg    2820
gctctgtcca gcactggaga aatccccttt tatggcaaag ccatccccat cgagaccatc    2880
aagggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg    2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc    3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc    3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc    3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg    3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga    3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt    3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca    3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc    3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac    3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac    3540
```
Page 20

```
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gcccctgctg    3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc    3660
atggcatgca tgtcagctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga    3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg    3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtctttta ccgggagttc    3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacggggaat gcagctcgcc    3900
gaacatttca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct    3960
gctgctcccg cggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg    4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc    4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat    4140
accctcctgt ttaacatcct ggggggatgg gtggccgccc aacttgctcc tcccagcgct    4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg    4260
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc    4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct    4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac    4440
gtggggcccag gggaggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg    4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact    4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac    4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc    4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga    4740
gtccccttct tctcatgtca acgtgggtac aagggagtct ggcggggcga cggcatcatg    4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg    4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac    4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctagggcgct gtggcgggtg    4980
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt ccactacgt gacgggcatg    5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg    5100
gatggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc    5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa    5220
ccggacgtag cagtgctcac ttccatgctc accgaccccct cccacattac ggcggagacg    5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctagccag    5340
ctgtctgcgc cttccttgaa ggcaacatgc actacccgtc atgactcccc ggacgctgac    5400
ctcatcgagg ccaacctcct gtggcggcag gagatggggcg ggaacatcac ccgcgtggag    5460
tcagaaaata aggtagtaat tttggactct ttcgagccgc tccaagcgga ggaggatgag    5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg    5580
cccatatggg cacgcccgga ttacaaccct ccactgttag agtcctggag ggacccggac    5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccggtacca    5700
cctccacgga ggaagaggac ggttgtcctg ccagaatcta ccgtgtcttc cgccctggcg    5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca    5820
acggcctctc ctgactagcc ctccaacgac ggcgacgcgg gatccgacgt tgagtcgtac    5880
tcccccatgc cccccttga ggggaggccg ggggatcccg attccagcga cgggtcttgg    5940
tctaccgtaa gcgaggggt tagtgaggac gtcgtctgct gctcgatgtc ctacacatgg    6000
acaggcgccc tgatcacgcc atgcgctgcg gaggaaacca agctgcccat caatgcactg    6060
agcaactctt tgctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc    6120
ctgcggcaga agaaggtcac cttttgacaga ctgcaggtcc tggacgacca ctaccgggac    6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag    6240
gaagcctgta gctgacgcc cccacattcg gccagatcta aatttggcta tggggcaaag    6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg    6360
ctggaagaca ctgagacacc aattgacacc accatcatgg caaaaaatga ggttttctgc    6420
gtccaaccag agaaggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg    6480
gttcgtgtgt gcgagaaaat ggccctttac gatgtggtct ccaccctccc tcaggccgtg    6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat    6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg ttttgactca    6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc    6720
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttcatcgg gggcccctg    6780
actaattcta aagggcagaa ctgcggctat cgccggtgcc gcgcgagcgg tgtactgacg    6840
accagctgcg gtaatacct cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg    6900
aagctccagg actgcacgat gctcgtatgc ggagacgacc ttgtcgttat ctgtgaaagc    6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagatac    7020
tctgccccc ctggggaccc gcccaaacca gaatacgact ggagttgat aacatcatgc    7080
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcacccgt    7140
gacccccacca cccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat    7200
tcctggctag gcaacatcat catgtatgcg cccaccttgt gggcaaggat gatcctgatg    7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag    7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc    7380
catggcctta gcgcattttc actccatagt tactctccag gtgagatcaa tagggtggct    7440
```

```
tcatgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt    7500
gtccgcgcta ggctactgtc ccaggggggg agggctgcca cttgtggcaa gtacctcttc    7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtc ccagttggat    7620
ttatccagct ggttcgttgc tggttacagc gggggagaca tatatcacag cctgtctcgt    7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtaggggt aggcatctat    7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt    7800
tttccctttt tttttttctt tttttttttt tttttttttt tttttttttt ttctcctttt    7860
tttttcctct tttttttcctt ttctttcctt tggtggctcc atcttagccc tagtcacggc    7920
tagctgtgaa aggtccgtga gccgcttgac tgcagagagt gctgatactg gcctctctgc    7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcggggtatg ccgcgtttta    8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataagct ttaatgcggt    8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg    8160
ctcatcgtca tcctcggcac cgtcaccctg gatgctgtag gcataggctt ggttatgccg    8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc    8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg caccgttct cggagcactg    8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac    8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccgacg catcgtggcc    8460
ggcatcaccg gcgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg    8520
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca    8580
ggccccgtgg ccggggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg    8640
gcggtgctca acggcctcaa cctactactg ggctgcttcc taatgcagga gtcgcataag    8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg    8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga    8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg    8880
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca gccttcgtc    8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc    9000
gacgcgctgg gctacgtctt gctggcgttc gcgacgcgag gctggatggc cttccccatt    9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcgt tgcaggccat gctgtccagg    9120
caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta    9180
acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg    9240
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt    9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg    9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa    9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca    9480
tctcgggcag cgttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga    9540
cccggctagg ctggcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc    9600
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct    9660
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt    9720
tccggatctg catcgcagga tgctgctggc tacccgtgg aacacctaca tctgtattaa    9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc ccgccgcatc cataccgcca    9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta acccgtatcg    9900
tgagcatcct ctctcgtttc atcggtatca ttacccccat gaacagaaat tccccccttac   9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag    10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga    10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt    10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca gcttgtct    10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcgggtg    10260
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat    10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga    10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg    10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta    10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc    10560
aggaaccgta aaaaggccgc gttgctggcg tttttccata ggctccgccc cctgacgagc    10620
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac    10680
caggcgtttc cccctggaag ctccctcgtg cgctctcctg ttccgaccct gccgcttacc    10740
ggatacctgt ccgcctttct cccttcggga agcgtggcgc tttctcatag ctcacgctgt    10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaacccccc    10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga    10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta    10980
ggcggtgcta cagagttctt gaagtggtgg cctaactacg ctacactag aaggacagta    11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga    11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg    11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag    11220
tggaacgaaa actcacgtta agggattttg gtcatgagat tatcaaaaag gatcttcacc    11280
tagatccttt tctagataat acgactcact ata                                11313
```
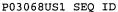
<210> 8
<211> 11313
<212> DNA
<213> Artificial Sequence

<220>
<223> Plasmid

<400> 8
```
gccagccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg     60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac    120
cccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag    180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc    240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg    300
gtgcttgcga gtgcccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac    360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc    420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct    480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg    540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca    600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc    660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga    720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc    780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc    840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg    900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct    960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc   1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc   1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc   1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg   1200
gtttccctct agcgggatca attccgcccc tctccctccc cccccctaa cgttactggc   1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg   1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct   1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca   1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgacccttttg caggcagcgg   1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct   1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa   1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt   1680
atgggatctg atctgggggc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa   1740
aacgtctagg cccccgaac cacggggacg tggtttttcct ttgaaaaaca cgataatacc   1800
atggcgccta ttacgcccta ctcccaacag acgcgaggcc tacttggctg catcatcact   1860
agcctcacag gccgggacag gaaccaggtc gagggggagg tccaagtggt ctccaccgca   1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc   1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac   2040
caggacctcg tcggctggca agcgcccccc ggggcgcgtt ccttgacacc atgcacctgc   2100
ggcagctcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg   2160
ggcgacagca gggggagcct actctccccc aggcccgtct cctacttgaa gggctcttcg   2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc   2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatggg aaccactatg   2340
cggtccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg   2400
gcccatctac acgcccctac tggtagcggc aagagcacta aggtgccgtc tgcgtatgca   2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg   2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc   2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc   2640
tctgggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact   2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg   2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg   2820
gctctgtcca gcactggaga aatccccttt tatggcaaag ccatccccat cgagaccatc   2880
aaggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg   2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc   3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc   3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc   3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg   3180
```

```
cagcggcgag gcaggactgg tagggggcagg atgggcattt acaggtttgt gactccagga   3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt   3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca   3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc   3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac   3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac   3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gcccctgctg   3600
tataggctgg gagccgttca aaacgaggtt actaccacac acccataac caaatacatc   3660
atggcatgca tgtcggctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga   3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg   3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtccttta ccgggagttc   3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacagggaat gcagctcgcc   3900
gaacaattca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct   3960
gctgctcccg tggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg   4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc   4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat   4140
accctcctgt ttaacatcct ggggggatgg gtggccgccc aacttgctcc tcccagcgct   4200
gcttctgctt cgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg   4260
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc   4320
tttaaggtca tgagcggcga gatgcccctcc accgaggacc tggttaacct actccctgct   4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac   4440
gtgggcccag gggagggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg   4500
ggtaaccacg tctccccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact   4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac   4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc   4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga   4740
gtccccttct tctcatgtca acgtgggtac aagggagtct ggcggggcga cggcatcatg   4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg   4860
atcgtggggc ctaggacctg tagtaacacg tggcatgaaa cattccccat taacgcgtac   4920
accacgggcc cctgcacgcg ctccccggcg ccaaattatt ctagggcgct gtggcgggtg   4980
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt tccactacgt gacgggcatg   5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg   5100
gatgggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc   5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa   5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg   5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctagccag   5340
ctgtctgcgc cttccttgaa ggcaacatgc actacccgtc atgactcccc ggacgctgac   5400
ctcatcgagg ccaacctcct gtggcggcag gagatggggcg ggaacatcac ccgcgtggag   5460
tcagaaaata aggtagtaat tttggactct ttcgagccgc tccaagcgga ggaggatgag   5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg   5580
cccatatggg cacgcccgga ttacaaccct ccactgttag agtcctggaa ggacccggac   5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccgatacca   5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg   5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca   5820
acggcctctc ctgaccagcc ctccgacgac ggcgacgcgg gatccgacgt tgagtcgtac   5880
tcctccatgc cccccttga gggggagccg ggggatcccg atctcagcga cgggtcttgg   5940
tctaccgtaa gcgaggaggc tagtgaggac gtcgtctgct gctcgatgtc ctacacatgg   6000
acaggcgccc tgatcacgcc atgcgctgcg gaggaaacca agctgcccat caatgcactg   6060
agcaactctt tgctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc   6120
ctgcggcaga gaaggtcac ctttgacaga ctgcaggtcc tggacgacca ctaccgggac   6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag   6240
gaagcctgta agctgacgcc cccacattcg gccagatcta aatttggcta tggggcaaag   6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg   6360
ctggaagaca ctgagacaac aattgacacc accatcatgg caaaaaatga ggttttctgc   6420
gtccaaccag agaaggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg   6480
gttcgtgtgt gcgagaaaat ggcccttttac gatgtggtct ccaccctccc tcaggccgtg   6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat   6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg ttttgactca   6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc   6720
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttacatcgg gggccccctg   6780
actaattcta aagggcagaa ctgcggctat cgccggtgcc gcgcgagcgg tgtactgacg   6840
accagctgcg gtaatacccct cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg   6900
aagctccagg actgcacgat gctcgtatgc ggagacgacc ttgtcgttat ctgtgaaagc   6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagatac   7020
tctgccccccc ctggggaccc gcccaaacca gaatacgact tggagttgat aacatcatgc   7080
```

Page 24

```
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcacccgt    7140
gaccccacca cccccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat    7200
tcctggctag gcaacatcat catgtatgcg cccaccttgt gggcaaggat gatcctgatg    7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag    7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc    7380
catggcctta gcgcattttc actccatagt tactctccag gtgagatcaa tagggtggct    7440
tcatgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt    7500
gtccgcgcta ggctactgtc ccagggggggg agggctgcca cttgtggcaa gtacctcttc    7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtc ccagttggat    7620
ttatccagct ggttcgttgc tggttacagc gggggagaca tatatcacag cctgtctcgt    7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtaggggt aggcatctat    7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt    7800
tttcccttt ttttttttctt tttttttttt tttttttttt tttttttttt ttctccttttt    7860
ttttttcctct ttttttcctt ttctttccttt tggtggctcc atcttagccc tagtcacggc    7920
tagctgtgaa aggtccgtga gccgcttgac tgcagagagt gctgatactg gcctctctgc    7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcgggggtatg ccgcgtttta    8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataagct ttaatgcggt    8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg    8160
ctcatcgtca tcctcggcac cgtcaccctg gatgctgtag gcataggctt ggttatgccg    8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc    8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg cacccgttct cggagcactg    8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac    8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccggacg catcgtggcc    8460
ggcatcaccg gcgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg    8520
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca    8580
ggccccgtgg ccgggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg    8640
gcggtgctca acggcctcaa cctactactg ggctgcttcc taatgcagga gtcgcataag    8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg    8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga    8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg    8880
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca agccttcgtc    8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc    9000
gacgcgctgg gctacgtctt gctggcgttc gcgacgcgag gctggatggc cttccccatt    9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcgt tgcaggccat gctgtccagg    9120
caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta    9180
acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg    9240
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt    9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg    9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa    9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca    9480
tctcgggcag cgttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga    9540
cccggctagg ctggcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc    9600
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct    9660
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt    9720
tccggatctg catcgcagga tgctgctggc taccctgtgg aacacctaca tctgtattaa    9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc ccgccgcatc cataccgcca    9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta acccgtatcg    9900
tgagcatcct ctctcgtttc atcggtatca ttacccccat gaacagaaat tcccccttac    9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag   10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga   10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt   10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca gcgcttgtct   10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcggggt   10260
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat   10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga   10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg   10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta   10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc   10560
aggaaccgta aaaaggccgc gttgctggcg tttttccata ggctccgccc cctgacgag   10620
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac   10680
caggcgtttc ccctggaag ctccctcgtg cgctctcctg ttccgaccct gccgcttacc   10740
ggatacctgt ccgcctttct cccttcggga gcgtggcgc tttctcatag ctcacgctgt   10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaacccccc   10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga   10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta   10980
```

Page 25

```
ggcggtgcta cagagttctt gaagtggtgg cctaactacg gctacactag aaggacagta   11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga   11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg   11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag   11220
tggaacgaaa actcacgtta agggattttg gtcatgagat tatcaaaaag gatcttcacc   11280
tagatccttt tctagataat acgactcact ata                                11313
```

```
gccagccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg     60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac    120
cccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag    180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc    240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg    300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac    360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc    420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct    480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg    540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca    600
cgacggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc    660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga    720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc    780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc    840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg    900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct    960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc   1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc   1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc   1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg   1200
gtttccctct agcgggatca attccgcccc tctccctccc cccccctaa cgttactggc   1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttatttc caccatattg   1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct   1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca   1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgaccctttg caggcagcgg   1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct   1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa   1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt   1680
atgggatctg atctgggggcc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa   1740
aacgtctagg ccccccgaac cacggggacg tggttttcct ttgaaaaaca cgataatacc   1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact   1860
agcctcacag gccgggacag gaaccaggtc gaggggagg tccaagtggt ctccaccgca   1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc   1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac   2040
caggacctcg tcggctggca agcgcccccc ggcgcgcgtt ccttgacacc atgcacctgc   2100
ggcagctcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg   2160
ggcgacagca gggggagcct actctccccc aggcccgtct cctacttgaa gggctcttcg   2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc   2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatggg aaccactatg   2340
cggtcccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg   2400
gcccatctac acgcccctac tggtagcggc aagagcacta aggtgccggc tgcgtatgca   2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg   2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc   2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc   2640
tctgggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact   2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg   2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg   2820
```

```
gctctgtcca gcactggaga aatccccttt tatggcaaag ccatccccat cgagaccatc    2880
aaggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg    2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc    3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc    3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc    3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg    3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga    3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt    3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca    3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc    3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac    3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac    3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gcccctgctg    3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc    3660
atggcatgca tgtcggctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga    3720
gtcctagcag ctctggcctg gtattgcctg caacaggagg cgtggtcat tgtgggcagg    3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtcctta ccgggagttc    3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacagggaat gcagctcgcc    3900
gaacaattca acacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct    3960
gctgctcccg tggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg    4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc    4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat    4140
accctcctgt ttaacatcct ggggggatgg gtggccgccc aacttgctcc tcccagcgct    4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg    4260
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc    4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct    4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac    4440
gtgggcccag gggagggggc tgtgcagtgg atgaaccgac tgatagcgtt cgcttcgcgg    4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact    4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac    4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc    4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga    4740
gtccccttct tctcatgtca acgtgggtac aagggagtct ggcggggcga cggcatcatg    4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg    4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac    4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctagggcgct gtggcgggtg    4980
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt ccactacgt gacgggcatg    5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg    5100
gatggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc    5160
acattcctgg tcgggctcaa tcaataccctg gttgggtcac agctcccatg cgagcccgaa    5220
ccggacgtag cagtgctcac ttccatgctc accacccct cccacattac ggcggagacg    5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctatccag    5340
ctgtctgcgc cttccttgaa ggcaacatgc actacccgtc atgactcccc ggacgctgac    5400
ctcatcgagg ccaacctcct gtggcggcag gagatgggcg gaacatcac ccgcgtggag    5460
tcagaaaata aggtagtaat tttggagtct ttcgagccgc tccaagcgga ggaggatgag    5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg    5580
cccatatggg cacgcccgga ttacaacccct ccactgttag agtcctggaa ggaccgggac    5640
tacgtccctc cagtggtaca cggggtgtcca ttgccgcctg ccaaggcccc tccgatacca    5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg    5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca    5820
acggcctctc tgaccagcc ctccgacgac ggcgacgcgg gatccgacgt tgagtcgtac    5880
tcctccatgc cccccccttga gggggagccg ggggatcccg atctcagcga cgggtcttgg    5940
tctaccgtaa gcgaggaggc tagtgaggac gtcgtctgct gctcgatgtc ctacacatgg    6000
acaggcgccc tgatcacgcc atgcgctgcg gaggaaacca gctgcccat caatgcactg    6060
agcaactctt tgctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc    6120
ctgcggcaga agaaggtcac ctttgacaga ctgcaggtcc tggacgacca ctaccgggac    6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag    6240
gaagcctgta agctgacgcc cccacattcg gccagatcta aatttggcta tggggcaaag    6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg    6360
ctggaagaca ctgagacacc aattgacacc accatcatgg caaaaaatga ggttttctgc    6420
gtccaaccag agaagggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg    6480
gttcgtgtgt gcgagaaaat ggccctttac gatgtggtct ccaccctccc tcaggccgtg    6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat    6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg ttttgactca    6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc    6720
```

Page 27

```
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttacatcgg gggcccctg    6780
actaattcta aagggcagaa ctgcggctat cgccggtgcc gcgcgagcgg tgtactgacg    6840
accagctgcg gtaataccct cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg    6900
aagctccagg actgacgat gctcgtatgc ggagacgacc ttgtcattat ctgtgaaagc    6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagatac    7020
tctgcccccc ctggggaccc gcccaaacca gaatacgact tggagttgat aacatcatgc    7080
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcacccgt    7140
gacccacca ccccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat    7200
tcctggctag gcaacatcat catgtatgcg cccaccttgt gggcaaggat gatcctgatg    7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag    7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc    7380
catggcctta gcgcatttttc actccatagt tactctccag gtgagatcaa tagggtggct    7440
tcatgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt    7500
gtccgcgcta ggctactgtc ccagggggggg agggctgcca cttgtggcaa gtacctcttc    7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtct ccagttggat    7620
ttatccagct ggttcgttgc tggttacagc gggggagaca tatatcacag cctgtctcgt    7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtaggggt aggcatctat    7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt    7800
tttcccttttt tttttttctt ttttttttt ttttttttt ttttttttt ttctcctttt    7860
ttttcctct ttttttcctt ttctttcctt tggtggctcc atcttagccc tagtcacggc    7920
tagctgtgaa aggtccgtga ccggcttgac tgcagagagt gctgatactg gcctctctgc    7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcggggtatg ccgcgtttta    8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataagct ttaatgcggt    8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg    8160
ctcatcgtca tcctcggcac cgtcaccctg gatgctgtag gcataggctt ggttatgccg    8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc    8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg cacccgttct cggagcactg    8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac    8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccggacg catcgtggcc    8460
ggcatcaccg gcgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg    8520
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca    8580
ggccccgtgg ccggggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg    8640
gcggtgctca acggcctcaa cctactactg ggctgcttcc taatgcagga gtcgcataag    8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg    8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga    8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg    8880
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca gccttcgtc    8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc    9000
gacgcgctgg gctacgtctt gctggcgttc gcgacgcgag gctggatggc cttcccccatt    9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcat tgcaggccat gctgtccagg    9120
caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta    9180
acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg    9240
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt    9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg    9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa    9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca    9480
tctcgggcag cgtttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga    9540
cccggctagg ctggcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc    9600
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct    9660
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt    9720
tccggatctg catcgcagga tgctgctggc taccctgtgg aacacctaca tctgtattaa    9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc ccgccgcatc cataccgcca    9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta acccgtatcg    9900
tgagcatcct ctctcgtttc atcggtatca ttacccccat gaacagaaat tcccccttac    9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag   10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga   10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt   10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca gcttgtct    10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcgggtg   10260
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat   10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga   10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg   10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta   10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc   10560
aggaaccgta aaaaggccgc gttgctggcg tttttccata ggctccgccc ccctgacgag   10620
```

Page 28

```
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac   10680
caggcgtttc cccctggaag ctccctcgtg cgctctcctg ttccgaccct gccgcttacc   10740
ggatacctgt ccgcctttct cccttcggga agcgtggcgc tttctcatag ctcacgctgt   10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaacccccc   10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga   10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta   10980
ggcggtgcta cagagttctt gaagtggtgg cctaactacg gctacactag aaggacagta   11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga   11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg   11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag   11220
tggaacgaaa actcacgtta agggattttg gtcatgagat tatcaaaaag gatcttcacc   11280
tagatccttt tctagataat acgactcact ata                                11313
```

<210> 10
<211> 11313
<212> DNA
<213> Artificial Sequence

<220>
<223> Plasmid

<400> 10
```
gccagccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg     60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac    120
ccccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag    180
gacgaccggg tccttttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc    240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg    300
gtgcttgcga gtgccccggg aggtctcgta daccgtgcac catgagcacg aatcctaaac    360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc    420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct    480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg    540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca    600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc    660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga    720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc    780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc    840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg    900
ccaggctcaa ggcgcgcatg cccgacgggc gaggatctcgt cgtgacccat ggcgatgcct    960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc   1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc   1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc   1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg   1200
gtttccctct agcgggatca attccgcccc tctccctccc ccccccctaa cgttactggc   1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg   1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct   1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca   1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgaccctttg caggcagcgg   1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct   1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa   1620
tggctctcct caagcgtatt caacaaggg ctgaaggatg cccagaaggt accccattgt   1680
atgggatctg atctgggggc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa   1740
aacgtctagg cccccgaac cacgggacg tggttttcct ttgaaaaaca cgataatacc   1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact   1860
agcctcacag gccgggacag gaaccaggtc gaggggagg tccagtggt ctccaccgca   1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc   1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac   2040
caggacctcg tcggctggca agcgcccccc ggggcgcgtt ccttgacacc atgcacctgc   2100
ggcagctcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg   2160
ggcgacagca gggggagcct actctcccc aggcccgtct cctacttgaa gggctcttcg   2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc   2280
acccgagggg ttgcgaaggc ggtggacttt gtaccgtcg agtctatggg aaccactatg   2340
cggtccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg   2400
gcccatctac acgcccctac tggtagcggc aagagcacta aggtgccggc tgcgtatgca   2460
```

```
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg    2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc    2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc    2640
tctgggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact    2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg    2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg    2820
gctctgtcca gcactggaga aatccccttt tatggcaaag ccatccccat cgagaccatc    2880
aagggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg    2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc    3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc    3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc    3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg    3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga    3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt    3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca    3360
ccaggggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc    3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac    3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac    3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gcccctgctg    3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc    3660
atggcatgca tgtcagctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga    3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg    3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtctttta ccgggagttc    3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacggggaat gcagctcgcc    3900
gaacatttca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct    3960
gctgctcccg cggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg    4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc    4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat    4140
accctcctgt ttaacatcct gggggggatgg gtggccgccc aacttgctcc tcccagcgct    4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg    4260
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc    4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct    4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac    4440
gtgggcccag gggaggggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg    4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact    4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac    4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc    4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga    4740
gtccccttct tctcatgtca acgtgggtac aagggagtct ggcgggggcga cggcatcatg    4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg    4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac    4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctaggcgct gtggcggggtg    4980
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt tccactacgt gacgggcatg    5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg    5100
gatggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc    5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa    5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg    5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctagccag    5340
ctgtctgcgc cttccttgaa ggcaacatgc actaccgtc atgactcccc ggacgctgac    5400
ctcatcgagg ccaacctcct gtggcggcag gagatggggcg ggaacatcac ccgcgtggag    5460
tcagaaaata aggtagtaat tttggactct ttcgagccgc tccaagcgga ggaggatgag    5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg    5580
cccatatggg cacgcccgga ttacaacct ccactgttag agtcctggaa ggacccggac    5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccgatacca    5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg    5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca    5820
acggcctctc ctgaccagcc ctccgacgac ggcgacgcgg gatccgacgt tgagtcgtac    5880
tcctccatgc ccccccttga ggggggagccg ggggatcccg atctcagcga cgggtcttgg    5940
tctaccgtaa gcgaggaggc tagtgaggac gtcgtctgct gctcgatgtc ctacacatgg    6000
acaggcgccc tgatcacgcc atgcgctgcg gaggaaacca agctgcccat caatgcactg    6060
agcaactctt gctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc    6120
ctgcggcaga agaaggtcac ctttgacaga ctgcaggtcc tggacgacca ctaccgggac    6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag    6240
gaagcctgta agctgacgcc cccacattcg ccagatcta aatttggcta tggggcaaag    6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg    6360
```

```
ctggaagaca ctgagacacc aattgacacc accatcatgg caaaaaatga ggttttctgc    6420
gtccaaccag agaagggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg    6480
gttcgtgtgt gcgagaaaat ggccctttac gatgtggtct ccaccctccc tcaggccgtg    6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat    6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg ttttgactca    6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc    6720
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttacatcgg gggccccctg    6780
actaattcta aagggcagaa ctgcggctat cgccggtgcc gcgcgagcgg tgtactgacg    6840
accagctgcg gtaataccct cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg    6900
aagctccagg actgcacgat gctcgtatgc ggagacgacc ttgtcgttat ctgtgaaagc    6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagatac    7020
tctgcccccc ctggggaccc gcccaaacca gaatacgact tggagttgat aacatcatgc    7080
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcacccgt    7140
gaccccacca cccccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat    7200
tcctggctag gcaacatcat catgtatgcg cccacccttgt gggcaaggat gatcctgatg    7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag    7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc    7380
catggcctta gcgcatttc actccatagt tactctccag gtgagatcaa tagggtggct    7440
tcatgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt    7500
gtccgcgcta ggctactgtc ccaggggggg agggctgcca cttgtggcaa gtacctcttc    7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtc ccagttggat    7620
ttatccagct ggttcgttgc tggttacagc gggggagaca tatatcacag cctgtctcgt    7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtaggggt aggcatctat    7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt    7800
tttcccttt tttttttctt tttttttttt tttttttttt tttttttttt ttctcctttt    7860
tttttcctct tttttttcctt ttctttcctt tggtggctcc atcttagccc tagtcacggc    7920
tagctgtgaa aggtccgtga gccgcttgac tgcagagagt gctgatactg gcctctctgc    7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcggggtatg ccgcgtttta    8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataagct ttaatgcggt    8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg    8160
ctcatcgtca tcctcggcac cgtcaccctg gatgctgtag gcataggctt ggttatgccg    8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc    8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg cacccgttct cggagcactg    8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac    8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccggacg catcgtggcc    8460
ggcatcaccg gcgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg    8520
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca    8580
ggccccgtgg ccgggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg    8640
gcggtgctca acggcctcaa cctactactg ggctgcttcc taatgcagga gtcgcataag    8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg    8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga    8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg    8880
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca agccttcgtc    8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc    9000
gacgcgctgg gctacgtctt gctggcgttc gcgacgcgag gctggatggc cttccccatt    9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcgt tgcaggccat gctgtccagg    9120
caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta    9180
acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg    9240
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt    9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg    9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa    9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca    9480
tctcgggcag cgttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga    9540
cccggctagg ctggcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc    9600
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct    9660
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt    9720
tccggatctg catcgcagga tgctgctggc taccctgtgg aacacctaca tctgtattaa    9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc cgccgcatc cataccgcca    9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta acccgtatcg    9900
tgagcatcct ctctcgtttc atcggtatca ttacccccat gaacagaaat ccccccttac    9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag   10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga   10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt   10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca cagcttgtct   10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcgggtg   10260
```

Page 31

```
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat     10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga     10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg     10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta     10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc     10560
aggaaccgta aaaaggccgc gttgctggcg ttttttccata ggctccgccc ccctgacgag     10620
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac     10680
caggcgtttc ccccctggaag ctcccctcgtg cgctctcctg ttccgaccct gccgcttacc    10740
ggatacctgt ccgcctttct cccttcggga agcgtggcgc tttctcatag ctcacgctgt      10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaaccccc      10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga      10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta      10980
ggcggtgcta cagagttctt gaagtggtgg cctaactacg gctacactag aaggacagta      11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga      11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg      11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag      11220
tggaacgaaa actcacgtta agggatttttg gtcatgagat tatcaaaaag gatcttcacc     11280
tagatccttt tctagataat acgactcact ata                                  11313
```

```
<210> 11
<211> 11184
<212> DNA
<213> Artificial Sequence

<220>
<223> Plasmid

<400> 11
gccagccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg        60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac       120
ccccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag      180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc       240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg        300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac       360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc       420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct       480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg        540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca       600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc       660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga       720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc       780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc       840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg       900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct       960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc      1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc     1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc      1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg      1200
gtttccctct agcgggatca attccgcccc tctccctccc cccccctaa cgttactggc       1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg      1320
ccgtctttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct     1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca      1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgacccttttg caggcagcgg      1500
aaccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct      1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa      1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt      1680
atgggatctg atctggggcc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa      1740
aacgtctagg ccccccgaac cacggggacg tggttttcct ttgaaaaaca cgataatacc      1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact     1860
agcctcacag gccgggacag gaaccaggtc gaggggagg tccaagtggt ctccaccgca       1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc      1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac      2040
caggacctcg tcggctggca agcgcccccc ggggcgcgtt ccttgacacc atgcacctgc     2100
```

```
ggcagctcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg     2160
ggcgacagca gggggagcct actctccccc aggcccgtct cctacttgaa gggctcttcg     2220
ggcggtccac tgctctgccc ctcgggggcac gctgtgggca tctttcgggc tgccgtgtgc     2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatgga aaccactatg     2340
cggtccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg     2400
gcccatctac acgcccctac tggtagcggc aagagcacta aggtgccggc tgcgtatgca     2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg     2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc     2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc     2640
tctggggggcg cctatgacat cataaatatgt gatgagtgcc actcaactga ctcgaccact     2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg     2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg     2820
gctctgtcca gcactggaga aatccccttt tatggcaaag ccatccccat cgagaccatc     2880
aagggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg     2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc     3000
ataccaacta gcggagacgt cattgtcgta gcaacgacg ctctaatgac gggctttacc     3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc     3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg     3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga     3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt     3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca     3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc     3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac     3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac     3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gccctgctg     3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc     3660
atggcatgca tgtcggctga cctggaggtc gtcacgagca cctgggtct ggtaggcgga     3720
gtcctagcag ctctggccgc gtattgcctg acaacgacga gcgtggtcac tgtggggcagg     3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtcctta ccgggagttc     3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacagggaat gcagctcgcc     3900
gaacaattca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct     3960
gctgctcccg tggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg     4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc     4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat     4140
accctcctgt ttaacatcct ggggggatgg gtggccgccc aacttgctcc tcccagcgct     4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg     4260
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc     4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct     4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac     4440
gtgggcccag gggagggggc tgtgcagtgg atgaaccgac tgatagcatt cgcttcgcgg     4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact     4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac     4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc     4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga     4740
gtcccettct tctcatgtca acgtgggtac aagggagtct ggcgggggcga cggcatcatg     4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg     4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac     4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctagggcgct gtggcgggtg     4980
gctgctgagg agtacgtgga ggttacgcgg gtggggggatt tccactacgt gacgggcatg     5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg     5100
gatggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc     5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa     5220
ccggacgtag cagtgctcac ttccatgctc accgaccct cccacattac ggcggagacg     5280
gctaagcgta ggctggccag gggatctccc cctccttgg ccagctcatc agctatccag     5340
ctgtctgcgc cttccttgaa ggcaacatgc actacccgtc atgactcccc ggacgctgac     5400
ctcatcgagg ccaacctcct gtggcggcag gagatggggcg ggaacatcac ccgcgtggag     5460
tcagaaaata aggtagtaat tttggagtct ttcgagccgc tccaagcgga ggaggatgag     5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg     5580
cccatatggg cactcccgga ttacaacct ccactgttag agtcctggaa ggacccggac     5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccggtacca     5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg     5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca     5820
acggcctctc ctggtgagga cgtcgtctgc tgctcgatgt cctacacatg gacaggcgcc     5880
ctgatcacgc catgcgctgc ggaggaaacc aagctgccca tcaatgcact gagcaactct     5940
ttgctccgac accacaactt ggtctatgct acaacatctc gcagcgcaag cctgcggcag     6000
```

Page 33

```
aagaaggtca cctttgacag actgcaggtc ctggacgacc actaccggga cgtgctcaag    6060
gagatgaagg cgaaggcgtc cacagttaag gctaaacttc tatccgtgga ggaagcctgt    6120
aagctgacgc ccccacattc ggccagatct aaatttggct atggggcaaa ggacgtccgg    6180
aacctatcca gcaaggccgt taaccacatc cgctccgtgt ggaaggactt gctggaagac    6240
actgagacac caattgacac caccatcatg gcaaaaaatg aggttttctg cgtccaacca    6300
gagaagggg gccgcaagcc agctcgcctt atcgtattcc cagatttggg ggttcgtgtg    6360
tgcgagaaaa tggcccttta cgatgtggtc tccaccctcc ctcaggccgt gatgggctct    6420
tcatacggat tccaatactc tcctggacag cgggtcgagt tcctggtgaa tgcctggaaa    6480
gcgaagaaat gccctatggg cttcgcatat gacacccgct gttttgactc aacggtcact    6540
gagaatgaca tccgtgttga ggagtcaatc taccaatgtt gtgacttggc ccccgaagcc    6600
agacaggcca taaggtcgct cacagagcgg ctttacatcg ggggccccct gactaattct    6660
aaagggcaga actgcggcta tcgccggtgc cgcgcgagcg gtgtactgac gaccagctgc    6720
ggtaataccc tcacatgtta cttgaaggcc gctgcggcct gtcgagctgc gaagctccag    6780
gactgcacga tgctcgtatg cggagacgac cttgtcgtta tctgtgaaag cgcggggacc    6840
caagaggacg aggcgagcct acgggccttc acggaggcta tgactagata ctctgccccc    6900
cctgggggacc cgcccaaacc agaatacgac ttggagttga taacatcatg ctcctccaat    6960
gtgtcagtcg cgcacgatgc atctggcaaa agggtgtact atctcacccg tgacccccacc    7020
accccccttg cgcgggctgc gtgggagaca gctagacaca ctccagtcaa ttcctggcta    7080
ggcaacatca tcatgtatgc gcccaccttg tgggcaagga tgatcctgat gactcatttc    7140
ttctccatcc ttctagctca ggaacaactt gaaaaagccc tagattgtca gatctacggg    7200
gcctgttact ccattgagcc acttgaccta cctcagatca ttcaacgact ccatggcctt    7260
agcgcatttt cactccatag ttactctcca ggtgagatca ataggtggc ttcatgcctc    7320
aggaaacttg gggtaccgcc cttgcgagtc tggagacatc gggccagaag tgtccgcgct    7380
aggctactgt cccagggggg gagggctgcc acttgtggca agtacctctt caactgggca    7440
gtaaggacca agctcaaact cactccaatc ccggctgcgt cccagttgga tttatccagc    7500
tggttcgttg ctggttacag cggggggagac atatatcaca gcctgtctcg tgcccgaccc    7560
cgctggttca tgtggtgcct actcctactt tctgtagggg taggcatcta tctactcccc    7620
aaccgatgaa cgggggaccta aacactccag gccaataggc catcctgttt ttttccctt    7680
tttttttttct tttttttttt tttttttttt tttttttttt tttctccttt tttttttcctc    7740
tttttttcct tttctttcct ttggtggctc catcttagcc ctagtcacgg ctagctgtga    7800
aaggtccgtg agccgcttga ctgcagagag tgctgatact ggcctctctg cagatcaagt    7860
actcctgcag gcgcgccact agtgggaata cgcggggtat gccgcgtttt agcatattga    7920
cgacccaatt ctcatgtttg acagcttatc atcgataagc tttaatgcgg tagtttatca    7980
cagttaaatt gctaacgcag tcaggcaccg tgtatgaaat ctaacaatgc gctcatcgtc    8040
atcctcggca ccgtcaccct ggatgctgta ggcataggct tggttatgcc ggtactgccg    8100
ggcctcttgc gggatatcgt ccattccgac agcatcgcca gtcactatgg cgtgctgcta    8160
gcgctatatg cgttgatgca atttctatgc gcacccgttc tcggagcact gtccgaccgc    8220
tttggccgcc gcccagtcct gctcgcttcg ctacttggag ccactatcga ctacgcgatc    8280
atggcgacca cacccgtcct gtggatcctc tacgccggac gcatcgtgac cggcatcacc    8340
ggcgccacag gtgcggttgc tggcgcctat atcgccgaca tcaccgatgg ggaagatcgg    8400
gctcgccact tcgggctcat gagcgcttgt ttcggcgtgg gtatggtggc aggccccgtg    8460
gccgggggac tgttgggcgc catctccttg catgcaccat tccttgcggc ggcggtgctc    8520
aacggcctca acctactact gggctgcttc ctaatgcagg agtcgcataa gggagagcgt    8580
cgaccgatgc ccttgagagc cttcaaccca gtcagctcct tccggtgggc gcggggcatg    8640
actatcgtcg ccgcacttat gactgtcttc tttatcatgc aactcgtagg acaggtgccg    8700
gcagcgctct gggtcatttt cggcgaggac cgctttcgct ggagcgcgac gatgatcggc    8760
ctgtcgcttg cggtattcgg aatcttgcac gccctcgctc aagccttcgt cactggtccc    8820
gccaccaaac gtttcggcga gaagcaggcc attatcgccg gcatggcggc cgacgcgctg    8880
ggctacgtct tgctggcgtt cgcgacgcga ggctggatgg ccttccccat tatgattctt    8940
ctcgcttccg gcggcatcgg gatgcccgcg ttgcaggcca tgctgtccag gcaggtagat    9000
gacgaccatc agggacagct tcaaggatcg ctcgcggctc ttaccagcct aacttcgatc    9060
actggaccgc tgatcgtcac ggcgatttat gccgcctcgg cgagcacatg aacgggttg    9120
gcatggattg taggcgccgc cctatacctt gtctgcctcc ccgcgttgcg tcgcggtgca    9180
tggagccggg ccacctcgac ctgaatggaa gccggcggca cctcgctaac ggattcacca    9240
ctccaagaat tggagccaat caattcttgc ggagaactgt gaatgcgcaa accaaccctt    9300
ggcagaacat atccatcgcg tccgccatct ccagcagccg cacgcggcgc atctcgggca    9360
gcgttgggtc ctggccacgg gtgcgcatga tcgtgctcct gtcgttgagg acccggctag    9420
gctggcgggg ttgccttact ggttagcaga atgaatcacc gatacgcgag cgaacgtgaa    9480
gcgactgctg ctgcaaaacg tctgcgacct gagcaacaac atgaatggtc ttcggtttcc    9540
gtgtttcgta aagtctggaa acgcggaagt cagcgccctg caccattatg ttccggatct    9600
gcatcgcagg atgctgctgg ctaccctgtg gaacacctac atctgtatta cgaagcgct    9660
ggcattgacc ctgagtgatt tttctctggt cccgccgcat ccataccgcc agttgtttac    9720
cctcacaacg ttccagtaac cgggcatgtt catcatcagt aacccgtatc gtgagcatcc    9780
tctctcgttt catcggtatc attacccca tgaacagaaa ttcccccttа cacggaggca    9840
tcaagtgacc aaacaggaaa aaaccgccct taacatggcc cgctttatca gaagccagac    9900
```

```
attaacgctt ctggagaaac tcaacgagct ggacgcggat gaacaggcag acatctgtga      9960
atcgcttcac gaccacgctg atgagcttta ccgcagctgc ctcgcgcgtt tcggtgatga     10020
cggtgaaaac ctctgacaca tgcagctccc ggagacggtc acagcttgtc tgtaagcgga     10080
tgccgggagc agacaagccc gtcagggcgc gtcagcgggt gttggcgggt gtcggggcgc     10140
agccatgacc cagtcacgta gcgatagcgc agtgtatact ggcttaacta tgcggcatca     10200
gagcagattg tactgagagt gcaccatatg cggtgtgaaa taccgcacag atgcgtaagg     10260
agaaaatacc gcatcaggcg ctcttccgct tcctcgctca ctgactcgct gcgctcggtc     10320
gttcggctgc ggcgagcggt atcagctcac tcaaaggcgg taatacggtt atccacagaa     10380
tcagggggata acgcaggaaa gaacatgtga gcaaaaggcc agcaaaaggc aggaaccgt     10440
aaaaaggccg cgttgctggc gtttttccat aggctccgcc ccccctgacga gcatcacaaa     10500
aatcgacgct caagtcagag gtggcgaaac ccgacaggac tataaagata ccaggcgttt     10560
ccccctggaa gctccctcgt gcgctctcct gttccgaccc tgccgcttac cggatacctg     10620
tccgcctttc tcccttcggg aagcgtggcg ctttctcata gctcacgctg taggtatctc     10680
agttcggtgt aggtcgttcg ctccaagctg ggctgtgtgc acgaacccccc cgttcagccc     10740
gaccgctgcg ccttatccgg taactatcgt cttgagtcca acccggtaag acacgactta     10800
tcgccactgg cagcagccac tggtaacagg attagcagag cgaggtatgt aggcggtgct     10860
acagagttct tgaagtggtg gcctaactac ggctacacta gaaggacagt atttggtatc     10920
tgcgctctgc tgaagccagt taccttcgga aaaagagttg gtagctcttg atccggcaaa     10980
caaaccaccg ctggtagcgg tggtttttttt gtttgcaagc agcagattac gcgcagaaaa     11040
aaaggatctc aagaagatcc tttgatcttt tctacgggggt ctgacgctca gtggaacgaa     11100
aactcacgtt aagggatttt ggtcatgaga ttatcaaaaa ggatcttcac ctagatcctt     11160
ttctagataa tacgactcac tata                                            11184
```

<210> 12
<211> 11313
<212> DNA
<213> Artificial Sequence

<220>
<223> Plasmid

<400> 12

```
gccagccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg       60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac      120
cccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag      180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc      240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg      300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac      360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc      420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct      480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg      540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca      600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc      660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga      720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc      780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc      840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg      900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct      960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc     1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc     1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc     1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg     1200
gtttccctct agcgggatca attccgcccc tctccctccc ccccccctaa cgttactggc     1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg     1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct     1380
aggggtcttt ccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca     1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgaccctttg caggcagcgg     1500
aacccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct     1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa     1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt     1680
atgggatctg atctgggggcc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa     1740
aacgtctagg cccccccgaac cacgggggacg tggttttcct ttgaaaaaca cgataatacc     1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact     1860
```

```
agcctcacag gccgggacag gaaccaggtc gagggggagg tccaagtggt ctccaccgca    1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc    1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac    2040
caggacctcg tcggctggca agcgccccc gggcgcgtt ccttgacacc atgcacctgc    2100
ggcagctcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg    2160
ggcgacagca gggggagcct actctccccc aggcccgtct cctacttgaa gggctcttcg    2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc    2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatgga aaccactatg    2340
cggtccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg    2400
gcccatctac acgcccctac tggtagcggc aagagcacta aggtgccggc tgcgtatgca    2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg    2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc    2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc    2640
tctgggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact    2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg    2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg    2820
gctctgtcca gcactggaga aatccccttt tatggtgcaaag ccatccccat cgagaccatc    2880
aagggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg    2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc    3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc    3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc    3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg    3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga    3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt    3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca    3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc    3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac    3480
ctggtagcat accaggctac ggtgtgcgcc agggtcagg ctccacctcc atcgtgggac    3540
caaatgtgga agtgtctgat acggctaaag cctacgctgc acgggccaac gcccctgctg    3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc    3660
atggcatgca tgtcagctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga    3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg    3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtctttta ccgggagttc    3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacggggaat gcagctcgcc    3900
gaacatttca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct    3960
gctgctcccg cggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg    4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc    4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat    4140
accctcctgt ttaacatcct gggggggatgg gtggccgccc aacttgctcc tcccagcgct    4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggc    4260
aaggtgcttg tggatatttt ggcaggttat ggagcgcaggg tggcaggcgc gctcgtggcc    4320
tttaaggtca tgagcggcga gatgcccctcc accgaggacc tggttaacct actccctgct    4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac    4440
gtgggcccag gggaggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg    4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact    4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac    4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc    4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga    4740
gtccccttct ctcatgtca acgtgggtac aagggagtct ggcggggcga cggcatcatg    4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg    4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac    4920
accacgggcc cctgcacgcc ctccccggcc ccaaattatt ctagggcgct gtggcgggtg    4980
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt tccactacgt gacggcgcatg    5040
accactgaca acgtaaagtg cccgtggcag gttccggccc ccgaattctt cacagaagtg    5100
gatgggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc    5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa    5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg    5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctagccag    5340
ctgtctgcgc cttccttgaa ggcaacatgc actacccgtc atgactcccc ggacgctgac    5400
ctcatcgagg ccaacctcct gtggcggcag gagatgggcg gaacatcac ccgcgtggag    5460
tcagaaaata aggtagtaat tttggactct ttcgagccgc tccaagcgga ggaggatgag    5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg    5580
cccatatggg cacgcccgga ttacaaccct ccactgttag agtcctggaa ggacccggac    5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccgatacca    5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg    5760
```

```
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca    5820
acggcctctc ctgaccagcc ctccgacgac ggcgacgcgg gatccgacgt tgagtcgtac    5880
tcctccatgc cccccccttga gggggagccg ggggatcccg atctcagcga cgggtcttgg    5940
tctaccgtaa gcgaggaggc tagtgaggac gtcgtctact actcgatgtc ctacacatgg    6000
acaggcgccc tgatcacgcc atgcgctgcg gaggaaacca agctgcccat caatgcactg    6060
agcaactctt tgctccgtca ccacaacttg gtctatgcta caacatctcg cagcgcaagc    6120
ctgcggcaga agaaggtcac cttttgacaga ctgcaggtcc tggacgacca ctaccgggac    6180
gtgctcaagg agatgaaggc gaaggcgtcc acagttaagg ctaaacttct atccgtggag    6240
gaagcctgta agctgacgcc cccacattcg gccagatcta aatttggcta tggggcaaag    6300
gacgtccgga acctatccag caaggccgtt aaccacatcc gctccgtgtg gaaggacttg    6360
ctggaagaca ctgagacacc aattgacacc accatcatgg caaaaaatga ggttttctgc    6420
gtccaaccag agaaggggg ccgcaagcca gctcgcctta tcgtattccc agatttgggg    6480
gttcgtgtgt gcgagaaaat ggccctttac gatgtggtct ccaccctccc tcaggccgtg    6540
atgggctctt catacggatt ccaatactct cctggacagc gggtcgagtt cctggtgaat    6600
gcctggaaag cgaagaaatg ccctatgggc ttcgcatatg acacccgctg tttttgactca    6660
acggtcactg agaatgacat ccgtgttgag gagtcaatct accaatgttg tgacttggcc    6720
cccgaagcca gacaggccat aaggtcgctc acagagcggc tttacatcgg gggccccctg    6780
actaattcta aagggcagaa ctgcggctat cgccggtgcc gcgcgagcgg tgtactgacg    6840
accagctgcg gtaataccct cacatgttac ttgaaggccg ctgcggcctg tcgagctgcg    6900
aagctccagg actgcacgat gctcgtatgc ggagacgacc ttgtcgttat ctgtgaaagc    6960
gcggggaccc aagaggacga ggcgagccta cgggccttca cggaggctat gactagatac    7020
tctgcccccc ctggggaccc gcccaaacca gaatacgact tggagttgat aacatcatgc    7080
tcctccaatg tgtcagtcgc gcacgatgca tctggcaaaa gggtgtacta tctcacccgt    7140
gaccccacca ccccccttgc gcgggctgcg tgggagacag ctagacacac tccagtcaat    7200
tcctggctag gcaacatcat catgtatgcg cccaccttgt gggcaaggat gatcctgatg    7260
actcatttct tctccatcct tctagctcag gaacaacttg aaaaagccct agattgtcag    7320
atctacgggg cctgttactc cattgagcca cttgacctac ctcagatcat tcaacgactc    7380
catggcctta gcgcattttc actccatagt tactctccag gtgagatcaa tagggtggct    7440
tcatcgcctca ggaaacttgg ggtaccgccc ttgcgagtct ggagacatcg ggccagaagt    7500
gtccgcgcta ggctactgtc ccaggggggg aggggctgcca cttgtggcaa gtacctcttc    7560
aactgggcag taaggaccaa gctcaaactc actccaatcc cggctgcgtc ccagttggat    7620
ttatccagct ggttcgttgc tggttacagc gggggagaca tatatcacag cctgtctcgt    7680
gcccgacccc gctggttcat gtggtgccta ctcctacttt ctgtaggggt aggcatctat    7740
ctactcccca accgatgaac ggggacctaa acactccagg ccaataggcc atcctgtttt    7800
tttcctttt tttttttctt tttttttttt ttttttttt ttttttttt ttctcctttt    7860
ttttcctct ttttttcctt ttctttcctt tggtggctcc atcttagccc tagtcacggc    7920
tagctgtgaa aggtccgtga gccgcttgac tgcagagagt gctgatactg gcctctctgc    7980
agatcaagta ctcctgcagg cgcgccacta gtgggaatac gcggggtatg ccgcgtttta    8040
gcatattgac gacccaattc tcatgtttga cagcttatca tcgataagct ttaatgcggt    8100
agtttatcac agttaaattg ctaacgcagt caggcaccgt gtatgaaatc taacaatgcg    8160
ctcatcgtca tcctcggcac cgtcaccctg gatgctgtag gcataggctt ggttatgccg    8220
gtactgccgg gcctcttgcg ggatatcgtc cattccgaca gcatcgccag tcactatggc    8280
gtgctgctag cgctatatgc gttgatgcaa tttctatgcg cacccgttct cggagcactg    8340
tccgaccgct ttggccgccg cccagtcctg ctcgcttcgc tacttggagc cactatcgac    8400
tacgcgatca tggcgaccac acccgtcctg tggatcctct acgccggacg catcgtggcc    8460
ggcatcaccg gcgccacagg tgcggttgct ggcgcctata tcgccgacat caccgatggg    8520
gaagatcggg ctcgccactt cgggctcatg agcgcttgtt tcggcgtggg tatggtggca    8580
ggccccgtgg ccgggggact gttgggcgcc atctccttgc atgcaccatt ccttgcggcg    8640
gcggtgctca acggcctcaa cctactactg gctgcttcc taatgcagga gtcgcataag    8700
ggagagcgtc gaccgatgcc cttgagagcc ttcaacccag tcagctcctt ccggtgggcg    8760
cggggcatga ctatcgtcgc cgcacttatg actgtcttct ttatcatgca actcgtagga    8820
caggtgccgg cagcgctctg ggtcattttc ggcgaggacc gctttcgctg gagcgcgacg    8880
atgatcggcc tgtcgcttgc ggtattcgga atcttgcacg ccctcgctca agccttcgtc    8940
actggtcccg ccaccaaacg tttcggcgag aagcaggcca ttatcgccgg catggcggcc    9000
gacgcgctgg gctacgtctt gctggcgttc gcgacgcgag gctggatggc cttccccatt    9060
atgattcttc tcgcttccgg cggcatcggg atgcccgcgt tgcaggccat gctgtccagg    9120
caggtagatg acgaccatca gggacagctt caaggatcgc tcgcggctct taccagccta    9180
acttcgatca ctggaccgct gatcgtcacg gcgatttatg ccgcctcggc gagcacatgg    9240
aacgggttgg catggattgt aggcgccgcc ctataccttg tctgcctccc cgcgttgcgt    9300
cgcggtgcat ggagccgggc cacctcgacc tgaatggaag ccggcggcac ctcgctaacg    9360
gattcaccac tccaagaatt ggagccaatc aattcttgcg gagaactgtg aatgcgcaaa    9420
ccaacccttg gcagaacata tccatcgcgt ccgccatctc cagcagccgc acgcggcgca    9480
tctcgggcag cgttgggtcc tggccacggg tgcgcatgat cgtgctcctg tcgttgagga    9540
cccggctagg ctggcggggt tgccttactg gttagcagaa tgaatcaccg atacgcgagc    9600
gaacgtgaag cgactgctgc tgcaaaacgt ctgcgacctg agcaacaaca tgaatggtct    9660
```

Page 37

```
tcggtttccg tgtttcgtaa agtctggaaa cgcggaagtc agcgccctgc accattatgt      9720
tccggatctg catcgcagga tgctgctggc taccctgtgg aacacctaca tctgtattaa      9780
cgaagcgctg gcattgaccc tgagtgattt ttctctggtc ccgccgcatc cataccgcca      9840
gttgtttacc ctcacaacgt tccagtaacc gggcatgttc atcatcagta acccgtatcg      9900
tgagcatcct ctctcgtttc atcggtatca ttaccccat gaacagaaat tcccccttac      9960
acggaggcat caagtgacca aacaggaaaa aaccgccctt aacatggccc gctttatcag     10020
aagccagaca ttaacgcttc tggagaaact caacgagctg gacgcggatg aacaggcaga     10080
catctgtgaa tcgcttcacg accacgctga tgagctttac cgcagctgcc tcgcgcgttt     10140
cggtgatgac ggtgaaaacc tctgacacat gcagctcccg gagacggtca cagcttgtct     10200
gtaagcggat gccgggagca gacaagcccg tcagggcgcg tcagcgggtg ttggcgggtg     10260
tcggggcgca gccatgaccc agtcacgtag cgatagcgga gtgtatactg gcttaactat     10320
gcggcatcag agcagattgt actgagagtg caccatatgc ggtgtgaaat accgcacaga     10380
tgcgtaagga gaaaataccg catcaggcgc tcttccgctt cctcgctcac tgactcgctg     10440
cgctcggtcg ttcggctgcg gcgagcggta tcagctcact caaaggcggt aatacggtta     10500
tccacagaat caggggataa cgcaggaaag aacatgtgag caaaaggcca gcaaaaggcc     10560
aggaaccgta aaaaggccgc gttgctggcg tttttccata ggctccgccc ccctgacgag     10620
catcacaaaa atcgacgctc aagtcagagg tggcgaaacc cgacaggact ataaagatac     10680
caggcgtttc cccctggaag ctccctcgtg cgctctcctg ttccgaccct gccgcttacc     10740
ggatacctgt ccgcctttct cccttcggga agcgtggcgc tttctcatag ctcacgctgt     10800
aggtatctca gttcggtgta ggtcgttcgc tccaagctgg gctgtgtgca cgaacccccc     10860
gttcagcccg accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggtaaga     10920
cacgacttat cgccactggc agcagccact ggtaacagga ttagcagagc gaggtatgta     10980
ggcggtgcta cagagttctt gaagtggtgg cctaactacg gctacactag aaggacagta     11040
tttggtatct gcgctctgct gaagccagtt accttcggaa aaagagttgg tagctcttga     11100
tccggcaaac aaaccaccgc tggtagcggt ggtttttttg tttgcaagca gcagattacg     11160
cgcagaaaaa aaggatctca agaagatcct ttgatctttt ctacggggtc tgacgctcag     11220
tggaacgaaa actcacgtta agggattttg gtcatgagat tatcaaaaag gatcttcacc     11280
tagatccttt tctagataat acgactcact ata                                  11313
```

```
        <210> 13
        <211> 11184
        <212> DNA
        <213> Artificial Sequence

        <220>
        <223> Plasmid

        <400> 13
gccagccccc gattgggggc gacactccac catagatcac tcccctgtga ggaactactg       60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac      120
cccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag      180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc      240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg      300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac      360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc      420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct      480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg      540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca      600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga aggactggc      660
```

```
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga      720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg gctacctgcc      780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc      840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg      900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct      960
gcttgccgaa tatcatggtg gaaaatggcc gcttttctgg attcatcgac tgtggccggc     1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc     1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc     1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg     1200
gtttccctct agcgggatca attccgcccc tctccctccc cccccctaa cgttactggc     1260
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg     1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct     1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca     1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgaccctttg caggcagcgg     1500
```

```
aacccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata agatacacct    1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa    1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt    1680
atgggatctg atctggggggcc tcggtgcaca tgcttttacat gtgtttagtc gaggttaaaa    1740
aacgtctagg cccccccgaac cacggggacg tggttttcct ttgaaaaaca cgataatacc    1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact    1860
agcctcacag gccgggacag gaaccaggtc gaggggggagg tccaagtggt ctccaccgca    1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc    1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac    2040
caggacctcg tcggctggca agcgccccccc ggggcgcgtt ccttgacacc atgcacctgc    2100
ggcagctcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg    2160
ggcgacagca gggggagcct actctcccccc aggcccgtct cctacttgaa gggctcttcg    2220
ggcggtccac tgctctgccc ctcgggggcac gctgtgggca tctttcgggc tgccgtgtgc    2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatgga aaccactatg    2340
cggtccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg    2400
gcccatctac acgcccctac tggtagcggg aagagcacta aggtgccggc tgcgtatgca    2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg    2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc    2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc    2640
tctggggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact    2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg    2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg    2820
gctctgtcca gcactggaga aatccccttt tatggcaaag ccatccccat cgagaccatc    2880
aaggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg    2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc    3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc    3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc    3120
ctggacccga ccttcaccat tgagacgacg accggccac aagacgcggt gtcacgctcg    3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga    3240
gaacggcccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt    3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca    3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc    3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac    3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac    3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gcccctgctg    3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc    3660
atggcatgca tgtcagctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga    3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg    3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtcttta ccgggagttc    3840
gatgagatgg aagagtgcgc ctcacacctg aacgggggaat gcagctcgcc    3900
gaacatttca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct    3960
gctgctcccg cggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg    4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc    4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat    4140
accctcctgt ttaacatcct ggggggatgg gtggccgccc aacttgctcc tccagcgct    4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg    4260
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc    4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct    4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac    4440
gtgggcccag ggggaggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg    4500
ggtaaccacg tctccccac gcactatgtg cctgagagc acgctgcagc acgtgtcact    4560
cagatcctct ctagtcttac catcactgag ggctcacca gtggatcaac    4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc    4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga    4740
gtcccctttct tctcatgtca acgtgggtac aagggagtct ggcggggcga cggcatcatg    4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg    4860
atcgtgggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac    4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctagggcgct gtggcgggtg    4980
gctgctgagg agtacgtgga ggttacgcgg gtgggggatt ccactacgt gacgggcatg    5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg    5100
gatggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc    5160
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa    5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg    5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctatccag    5340
ctgtctgcgc cttccttgaa ggcaacatgc actacccgtc atgactcccc ggacgctgac    5400
```

Page 39

```
ctcatcgagg ccaacctcct gtggcggcag gagatgggcg ggaacatcac ccgcgtggag     5460
tcagaaaata aggtagtaat tttggagtct ttcgagccgc tccaagcgga ggaggatgag     5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaatttccc tcgagcgatg     5580
cccatatggg cactcccgga ttacaaccct ccactgttag agtcctggaa ggacccggac     5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccggtacca     5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg     5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca     5820
acggcctctc ctggtgagga cgtcgtctgc tgctcgatgt cctacacatg gacaggcgcc     5880
ctgatcacgc catgcgctgc ggaggaaacc aagctgccca tcaatgcact gagcaactct     5940
ttgctccgac accacaactt ggtctatgct acaacatctc gcagcgcaag cctgcggcag     6000
aagaaggtca cctttgacag actgcaggtc ctggacgacc actaccggga cgtgctcaag     6060
gagatgaagg cgaaggcgtc cacagttaag gctaaacttc tatccgtgga ggaagcctgt     6120
aagctgacgc ccccacattc ggccagatct aaatttggct atggggcaaa ggacgtccgg     6180
aacctatcca gcaaggccgt taaccacatc cgctccgtgt ggaaggactt gctggaagac     6240
actgagacac caattgacac caccatcatg gcaaaaaatg aggtttttctg cgtccaacca     6300
gagaagggggg gccgcaagcc agctcgcctt atcgtattcc cagatttggg ggttcgtgtg     6360
tgcgagaaaa tggcccttta cgatgtggtc tccaccctcc ctcaggccgt gatgggctct     6420
tcatacggat tccaatactc tcctggacag cgggtcgagt tcctggtgaa tgcctggaaa     6480
gcgaagaaat gccctatggg cttcgcatat gacacccgct gttttgactc aacggtcact     6540
gagaatgaca tccgtgttga ggagtcaatc taccaatgtt gtgacttggc ccccgaagcc     6600
agacaggcca taaggtcgct cacagagcgg ctttacatcg ggggcccccct gactaattct     6660
aaagggcaga actgcggcta tcgccggtgc cgcgcgagcg gtgtactgac gaccagctgc     6720
ggtaataccc tcacatgtta cttgaaggcc gctgcggcct gtcgagctgc gaagctccag     6780
gactgcacga tgctcgtatg cggagacgac cttgtcgtta tctgtgaaag cgcggggacc     6840
caagaggacg aggcgagcct acgggccttc acggaggcta tgactagata ctctgcccccc     6900
cctgggggacc cgcccaaacc agaatacgac ttggagttga taacatcatg ctcctccaat     6960
gtgtcagtcg cgcacggatgc atctggcaaa aagggtgtact atctcaccccg tgaccccacc     7020
acccccccttg cgcgggctgc gtgggagaca gctagacaca ctccagtcaa ttcctggcta     7080
ggcaacatca tcatgtatgc gcccaccttg tgggcaagga tgatcctgat gactcatttc     7140
ttctccatcc ttctagctca ggaacaactt gaaaaagccc tagattgtca gatctacggg     7200
gcctgttact ccattgagcc acttgaccta cctcagatca ttcaacgact ccatggcctt     7260
agcgcatttt cactccatag ttactctcca ggtgagatca ataggggtggc ttcatgcctc     7320
aggaaacttg gggtaccgcc cttgcgagtc tggagacatc gggccagaag tgtccgcgct     7380
aggctactgt cccaggggggg gagggctgcc acttgtggca agtacctctt caactgggca     7440
gtaaggacca agctcaaact cactccaatc ccggctgcgt cccagttgga tttatccagc     7500
tggttcgttg ctggttacag cggggggagac atatatcaca gcctgtctcg tgcccgaccc     7560
cgctggttca tgtggtgcct actcctactt tctgtagggg taggcatcta tctactcccc     7620
aaccgatgaa cggggaccta aacactccag gccaataggc catcctgttc ttttcccttt     7680
tttttttct tttttttttt tttttttttt tttttttttt tttctcctttt tttttttctc     7740
tttttttcct tttcttttcct ttggtggctc catcttagcc ctagtcacgg ctagctgtga     7800
aaggtccgtg agccgcttga ctgcagagag tgctgatact ggcctctctg cagatcaagt     7860
actcctgcag gcgcgccact agtgggaata cgcggggtat gccgcgtttt agcatattga     7920
cgacccaatt ctcatgtttg acagcttatc atcgataagc tttaatgcgg tagtttatca     7980
cagttaaatt gctaacgcag tcaggcaccg tgtatgaaat ctaacaatgc gctcatcgtc     8040
atcctcggca ccgtcaccct ggatgctgta ggcataggct tggttatgcc ggtactgccg     8100
ggcctcttgc gggatatcgt ccattccgac agcatcgcca gtcactatgg cgtgctgcta     8160
gcgctatatg cgttgatgca atttctatgc gcacccgttc tcggagcact gtccgaccgc     8220
tttggccgcc gcccagtcct gctcgcttcg ctacttggag ccactatcga ctacgcgatc     8280
atggcgacca cacccgtcct gtggatcctc tacgccggac gcatcgtggc cggcatcacc     8340
ggcgccacag gtgcggttgc tggcgcctat atcgccgaca tcaccgatgg ggaagatcgg     8400
gctcgccact tcgggctcat gagcgcttgt ttcggcgtgg gtatggtggc aggccccgtg     8460
gccggggggac tgttgggcgc catctccttg catgcaccat tccttgcggc ggcggtgctc     8520
aacggcctca acctactact gggctgcttc ctaatgcagg agtcgcataa gggagagcgt     8580
cgaccgatgc ccttgagagc cttcaaccca gtcagctcct tccggtgggc gcggggcatg     8640
actatcgtcg ccgcacttat gactgtcttc tttatcatgc aactcgtagg acaggtgccg     8700
gcagcgctct gggtcatttt cggcgaggac cgctttcgct ggagcgcgac gatgatcggc     8760
ctgtcgcttg cggtattcgg aatcttgcac gccctcgctc aagccttcgt cactggtccc     8820
gccaccaaac gtttcggcga agcaggcc attatcgccg gcatggcggc cgacgcgctg     8880
ggctacgtct tgctggcgtt cgcgacgcga ggctggatgg ccttccccat tatgattctt     8940
ctcgcttccg gcggcatcgg gatgcccgcg ttgcaggcca tgctgtccag gcaggtagat     9000
gacgaccatc agggacagct tcaaggatcg ctcgcggctc ttaccagcct aacttcgatc     9060
actggaccgc tgatcgtcac ggcgatttat ccgcctcgg cgagcacatg gaacgggttg     9120
gcatggattg taggcgccgc cctatacctt gtctgcctcc ccgcgttgcg tcgcggtgca     9180
tggagccggg ccacctcgac ctgaatggaa gccggcggca cctcgctaac ggattcacca     9240
ctccaagaat tggagccaat caattcttgc ggagaactgt gaatgcgcaa accaacccctt     9300
```

Page 40

```
ggcagaacat atccatcgcg tccgccatct ccagcagccg cacgcggcgc atctcgggca   9360
gcgttgggtc ctggccacgg gtgcgcatga tcgtgctcct gtcgttgagg acccggctag   9420
gctggcgggg ttgccttact ggttagcaga atgaatcacc gatacgcgag cgaacgtgaa   9480
acgactgctg ctgcaaaacg tctgcgacct gagcaacaac atgaatggtc ttcggtttcc   9540
gtgtttcgta aagtctggaa acgcggaagt cagcgccctg caccattatg ttccggatct   9600
gcatcgcagg atgctgctgg ctaccctgtg gaacacctac atctgtatta acgaagcgct   9660
ggcattgacc ctgagtgatt tttctctggt cccgccgcat ccataccgcc agttgtttac   9720
cctcacaacg ttccagtaac cgggcatgtt catcatcagt aacccgtatc gtgagcatcc   9780
tctctcgttt catcggtatc attaccccca tgaacagaaa ttccccctta cacggaggca   9840
tcaagtgacc aaacaggaaa aaaccgccct taacatggcc cgctttatca gaagccagac   9900
attaacgctt ctggagaaac tcaacgagct ggacgcggat gaacaggcag acatctgtga   9960
atcgcttcac gaccacgctg atgagcttta ccgcagctgc ctcgcgcgtt cggtgatga  10020
cggtgaaaac ctctgacaca tgcagctccc ggagacggtc acagcttgtc tgtaagcgga  10080
tgccgggagc agacaagccc gtcagggcgc gtcagcgggt gttggcgggt gtcggggcgc  10140
agccatgacc cagtcacgta gcgatagcgg agtgtgtgaa ggcttaacta tgcggcatca  10200
gagcagattg tactgagagt gcaccatatg cggtgtgaaa taccgcacag atgcgtaagg  10260
agaaaatacc gcatcaggcg ctcttccgct tcctcgctca ctgactcgct gcgctcggtc  10320
gttcggctgc ggcgagcggt atcagctcac tcaaaggcgg taatacggtt atccacagaa  10380
tcaggggata acgcaggaaa gaacatgtga gcaaaaggcc agcaaaaggc caggaaccgt  10440
aaaaaggccg cgttgctggc gtttttccat aggctccgcc ccctgacga gcatcacaaa  10500
aatcgacgct caagtcagag gtggcgaaac ccgacaggac tataaagata ccaggcgttt  10560
cccctggaa gctccctcgt gcgctctcct gttccgaccc tgccgcttac cggatacctg  10620
tccgccttt cccttcgggg aagcgtggcg ctttctcata gctcacgctg taggtatctc  10680
agttcggtgt aggtcgttcg ctccaagctg ggctgtgtgc acgaaccccc cgttcagccc  10740
gaccgctgcg ccttatccgg taactatcgt cttgagtcca acccggtaag acacgactta  10800
tcgccactgg cagcagccac tggtaacagg attagcagag cgaggtatgt aggcggtgct  10860
acagagttct tgaagtggtg gcctaactac ggctacacta gaaggacagt atttggtatc  10920
tgcgctctgc tgaagccagt taccttcgga aaaagagttg gtagctcttg atccggcaaa  10980
caaaccaccg ctggtagcgg tggtttttt gtttgcaagc agcagattac gcgcagaaaa  11040
aaaggatctc aagaagatcc tttgatcttt tctacggggt ctgacgctca gtggaacgaa  11100
aactcacgtt aagggatttt ggtcatgaga ttatcaaaaa ggatcttcac ctagatcctt  11160
ttctagataa tacgactcac tata                                         11184
```

<210> 14
<211> 11184
<212> DNA
<213> Artificial Sequence

<220>
<223> Plasmid

<400> 14
```
gccagccccc gattggggc gacactccac catagatcac tccctgtga ggaactactg    60
tcttcacgca gaaagcgtct agccatggcg ttagtatgag tgtcgtgcag cctccaggac   120
ccccctccc gggagagcca tagtggtctg cggaaccggt gagtacaccg gaattgccag   180
gacgaccggg tcctttcttg gatcaacccg ctcaatgcct ggagatttgg gcgtgccccc   240
gcgagactgc tagccgagta gtgttgggtc gcgaaaggcc ttgtggtact gcctgatagg   300
gtgcttgcga gtgccccggg aggtctcgta gaccgtgcac catgagcacg aatcctaaac   360
ctcaaagaaa aaccaaaggg cgcgccatga ttgaacaaga tggattgcac gcaggttctc   420
cggccgcttg ggtggagagg ctattcggct atgactgggc acaacagaca atcggctgct   480
ctgatgccgc cgtgttccgg ctgtcagcgc aggggcgccc ggttcttttt gtcaagaccg   540
acctgtccgg tgccctgaat gaactgcagg acgaggcagc gcggctatcg tggctggcca   600
cgacgggcgt tccttgcgca gctgtgctcg acgttgtcac tgaagcggga agggactggc   660
tgctattggg cgaagtgccg gggcaggatc tcctgtcatc tcaccttgct cctgccgaga   720
aagtatccat catggctgat gcaatgcggc ggctgcatac gcttgatccg ctacctgcc   780
cattcgacca ccaagcgaaa catcgcatcg agcgagcacg tactcggatg gaagccggtc   840
ttgtcgatca ggatgatctg gacgaagagc atcaggggct cgcgccagcc gaactgttcg   900
ccaggctcaa ggcgcgcatg cccgacggcg aggatctcgt cgtgacccat ggcgatgcct   960
gcttgccgaa tatcatggtg gaaaatggcc gctttctgg attcatcgac tgtggccggc  1020
tgggtgtggc ggaccgctat caggacatag cgttggctac ccgtgatatt gctgaagagc  1080
ttggcggcga atgggctgac cgcttcctcg tgctttacgg tatcgccgct cccgattcgc  1140
agcgcatcgc cttctatcgc cttcttgacg agttcttctg agtttaaaca gaccacaacg  1200
gtttccctct agcgggatca attccgcccc ctccctcccc ccccccctaa cgttactggc  1260
```

```
cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc caccatattg    1320
ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac gagcattcct    1380
aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt gaaggaagca    1440
gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgaccctttg caggcagcgg    1500
aacccccccac ctggcgacag gtgcctctgc ggccaaaggc cacgtgtata agatacacct    1560
gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga aagagtcaaa    1620
tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt accccattgt    1680
atgggatctg atctggggcc tcggtgcaca tgctttacat gtgtttagtc gaggttaaaa    1740
aacgtctagg ccccccgaac cacgggggacg tggtttttcct ttgaaaaaca cgataatacc    1800
atggcgccta ttacggccta ctcccaacag acgcgaggcc tacttggctg catcatcact    1860
agcctcacag gccgggacag gaaccaggtc gaggggggagg tccaagtggt ctccaccgca    1920
acacaatctt tcctggcgac ctgcgtcaat ggcgtgtgtt ggactgtcta tcatggtgcc    1980
ggctcaaaga cccttgccgg cccaaagggc ccaatcaccc aaatgtacac caatgtggac    2040
caggacctcg tcggctggca agcgcccccc ggggcgcgtt ccttgacacc atgcacctgc    2100
ggcagcgcgg acctttactt ggtcacgagg catgccgatg tcattccggt gcgccggcgg    2160
ggcgacagca gggggagcct actctcccccc aggcccgttt cctacttgaa gggctcttcg    2220
ggcggtccac tgctctgccc ctcggggcac gctgtgggca tctttcgggc tgccgtgtgc    2280
acccgagggg ttgcgaaggc ggtggacttt gtacccgtcg agtctatggg aaccactatg    2340
cggtccccgg tcttcacgga caactcgtcc cctccggccg taccgcagac attccaggtg    2400
gcccatctac acgcccctac tggtagcggc aagagcacta aggtgccggc tgcgtatgca    2460
gcccaagggt ataaggtgct tgtcctgaac ccgtccgtcg ccgccaccct aggtttcggg    2520
gcgtatatgt ctaaggcaca tggtatcgac cctaacatca gaaccggggt aaggaccatc    2580
accacgggtg cccccatcac gtactccacc tatggcaagt ttcttgccga cggtggttgc    2640
tctgggggcg cctatgacat cataatatgt gatgagtgcc actcaactga ctcgaccact    2700
atcctgggca tcggcacagt cctggaccaa gcggagacgg ctggagcgcg actcgtcgtg    2760
ctcgccaccg ctacgcctcc gggatcggtc accgtgccac atccaaacat cgaggaggtg    2820
gctctgtcca gcactggaga aatccccttt tatggcaaag ccatccccat cgagaccatc    2880
aagggggggga ggcacctcat tttctgccat tccaagaaga aatgtgatga gctcgccgcg    2940
aagctgtccg gcctcggact caatgctgta gcatattacc ggggccttga tgtatccgtc    3000
ataccaacta gcggagacgt cattgtcgta gcaacggacg ctctaatgac gggctttacc    3060
ggcgatttcg actcagtgat cgactgcaat acatgtgtca cccagacagt cgacttcagc    3120
ctggacccga ccttcaccat tgagacgacg accgtgccac aagacgcggt gtcacgctcg    3180
cagcggcgag gcaggactgg taggggcagg atgggcattt acaggtttgt gactccagga    3240
gaacggccct cgggcatgtt cgattcctcg gttctgtgcg agtgctatga cgcgggctgt    3300
gcttggtacg agctcacgcc cgccgagacc tcagttaggt tgcgggctta cctaaacaca    3360
ccagggttgc ccgtctgcca ggaccatctg gagttctggg agagcgtctt tacaggcctc    3420
acccacatag acgcccattt cttgtcccag actaagcagg caggagacaa cttcccctac    3480
ctggtagcat accaggctac ggtgtgcgcc agggctcagg ctccacctcc atcgtgggac    3540
caaatgtgga agtgtctcat acggctaaag cctacgctgc acgggccaac gccctgctg    3600
tataggctgg gagccgttca aaacgaggtt actaccacac accccataac caaatacatc    3660
atggcatgca tgtcagctga cctggaggtc gtcacgagca cctgggtgct ggtaggcgga    3720
gtcctagcag ctctggccgc gtattgcctg acaacaggca gcgtggtcat tgtgggcagg    3780
atcatcttgt ccggaaagcc ggccatcatt cccgacaggg aagtctttta ccgggagttc    3840
gatgagatgg aagagtgcgc ctcacacctc ccttacatcg aacggggaat gcagctcgcc    3900
gaacatttca aacagaaggc aatcgggttg ctgcaaacag ccaccaagca agcggaggct    3960
gctgctcccg cggtggaatc caagtggcgg accctcgaag ccttctgggc gaagcatatg    4020
tggaatttca tcagcgggat acaatattta gcaggcttgt ccactctgcc tggcaacccc    4080
gcgatagcat cactgatggc attcacagcc tctatcacca gcccgctcac cacccaacat    4140
accctcctgt ttaacatcct ggggggatgg gtggccgccc aacttgctcc tcccagcgct    4200
gcttctgctt tcgtaggcgc cggcatcgct ggagcggctg ttggcagcat aggccttggg    4260
aaggtgcttg tggatatttt ggcaggttat ggagcagggg tggcaggcgc gctcgtggcc    4320
tttaaggtca tgagcggcga gatgccctcc accgaggacc tggttaacct actccctgct    4380
atcctctccc ctggcgccct agtcgtcggg gtcgtgtgcg cagcgatact gcgtcggcac    4440
gtgggcccag gggaggggc tgtgcagtgg atgaaccggc tgatagcgtt cgcttcgcgg    4500
ggtaaccacg tctcccccac gcactatgtg cctgagagcg acgctgcagc acgtgtcact    4560
cagatcctct ctagtcttac catcactcag ctgctgaaga ggcttcacca gtggatcaac    4620
gaggactgct ccacgccatg ctccggctcg tggctaagag atgtttggga ttggatatgc    4680
acggtgttga ctgatttcaa gacctggctc cagtccaagc tcctgccgcg attgccggga    4740
gtcccccttct tctcatgtca acgtgggtac aaggagtct ggcggggcga cggcatcatg    4800
caaaccacct gcccatgtgg agcacagatc accggacatg tgaaaaacgg ttccatgagg    4860
atcgtggggc ctaggacctg tagtaacacg tggcatggaa cattccccat taacgcgtac    4920
accacgggcc cctgcacgcc ctccccggcg ccaaattatt ctagggcgct gtggcgggtg    4980
gctgctgagg agtacgtgga ggttacgcgg gtggggatt tccactacgt gacgggcatg    5040
accactgaca acgtaaagtg cccgtgtcag gttccggccc ccgaattctt cacagaagtg    5100
gatgggggtgc ggttgcacag gtacgctcca gcgtgcaaac ccctcctacg ggaggaggtc    5160
```

```
acattcctgg tcgggctcaa tcaatacctg gttgggtcac agctcccatg cgagcccgaa    5220
ccggacgtag cagtgctcac ttccatgctc accgacccct cccacattac ggcggagacg    5280
gctaagcgta ggctggccag gggatctccc ccctccttgg ccagctcatc agctatccag    5340
ctgtctgcgc cttccttgaa ggcaacatgc actacccgtc atgactcccc ggacgctgac    5400
ctcatcgagg ccaacctcct gtggcggcag gagatgggcg ggaacatcac ccgcgtggag    5460
tcagaaaata aggtagtaat tttggagtct ttcgagccgc tccaagcgga ggaggatgag    5520
agggaagtat ccgttccggc ggagatcctg cggaggtcca ggaaattccc tcgagcgatg    5580
cccatatggg cactcccgga ttacaaccct ccactgttag agtcctggaa ggacccggac    5640
tacgtccctc cagtggtaca cgggtgtcca ttgccgcctg ccaaggcccc tccggtacca    5700
cctccacgga ggaagaggac ggttgtcctg tcagaatcta ccgtgtcttc tgccttggcg    5760
gagctcgcca caaagacctt cggcagctcc gaatcgtcgg ccgtcgacag cggcacggca    5820
acggcctctc ctggtgagga cgtcgtctgc tgctcgatgt cctacacatg gacaggcgcc    5880
ctgatcacgc catgcgctgc ggaggaaacc aagctgccca tcaatgcact gagcaactct    5940
ttgctccgac accacaactt ggtctatgct acaacatctc gcagcgcaag cctgcggcag    6000
aagaaggtca cctttgacag actgcaggtc ctggacgacc actaccggga cgtgctcaag    6060
gagatgaagg cgaaggcgtc cacagttaag gctaaacttc tatccgtgga ggaagcctgt    6120
aagctgacgc ccccacattc ggccagatct aaatttggct atggggcaaa ggacgtccgg    6180
aacctatcca gcaaggccgt taaccacatc cgctccgtgt ggaaggactt gctggaagac    6240
actgagacac caattgacac caccatcatg gcaaaaaatg aggttttctg cgtccaacca    6300
gagaagggggg ccgcaagcc agctcgcctt atcgtattcc cagatttggg ggttcgtgtg    6360
tgcgagaaaa tggcccttta cgatgtggtc tccaccctcc ctcaggccgt gatgggctct    6420
tcatacggat tccaatactc tcctggacag cgggtcgagt tcctggtgaa tgcctggaaa    6480
gcgaagaaat gccctatggg cttcgcatat gacacccgct gttttgactc aacggtcact    6540
gagaatgaca tccgtgttga ggagtcaatc taccaatgtt gtgacttggc ccccgaagcc    6600
agacaggcca taaggtcgct cacagagcgg ctttacatcg ggggccccct gactaattct    6660
aaagggcaga actgcggcta tcgccggtgc cgcgcgagcg gtgtactgac gaccagctgc    6720
ggtaataccc tcacatgtta cttgaaggcc gctgcggcct gtcgagctgc gaagctccag    6780
gactgcacga tgctcgtatg cggagacgac cttgtcgtta tctgtgaaag cgcggggacc    6840
caagaggacg aggcgagcct acgggacctt acggaggcta tgactagata ctctgcccccc    6900
cctggggacc cgcccaaacc agaatacgac ttggagttga taacatcatg ctcctccaat    6960
gtgtcagtcg cgcacgatgc atctggcaaa agggtgtact atctcacccg tgacccccacc    7020
accccccttg cgcgggctgc gtgggagaca gctagacaca ctccagtcaa ttcctggcta    7080
ggcaacatca tcatgtatgc gcccaccttg tgggcaagga tgatcctgat gactcatttc    7140
ttctccatcc ttctagctca ggaacaactt gaaaaagccc tagattgtca gatctacggg    7200
gcctgttact ccattgagcc acttgaccta cctcagatca ttcaacgact ccatggcctt    7260
agcgcatttt cactccatag ttactctcca ggtgagatca atagggtggc ttcatgcctc    7320
aggaaacttg gggtaccgcc cttgcgagtc tggagacatc gggccagaag tgtccgcgct    7380
aggctactgt cccaggggggg gagggctgcc acttgtggca agtacctctt caactgggca    7440
gtaaggacca agctcaaact cactccaatc ccggctgcgt cccagttgga tttatccagc    7500
tggttcgttg ctggttacag cggggggagac atatatcaca gcctgtctcg tgcccgaccc    7560
cgctggttca tgtggtgcct actcctactt tctgtagggg taggcatctca tctactcccc    7620
aaccgatgaa cggggaccta aacactccag gccaataggc catcctgttt ttttcccttt    7680
ttttttttct ttttttttttt ttttttttttt ttttttttttt tttctccttt ttttttcctc    7740
ttttttttcct tttctttcct ttggtggctc catcttagcc ctagtcacgg ctagctgtga    7800
aaggtccgtg agccgcttga ctgcagagag tgctgatact ggcctctctg cagatcaagt    7860
actcctgcag gcgcgccact agtgggaata cgcggggtat gccgcgtttt agcatattga    7920
cgacccaatt ctcatgtttg acagcttatc atcgataagc tttaatgcgg tagtttatca    7980
cagttaaatt gctaacgcag tcaggcaccg tgtatgaaat ctaacaatgc gctcatcgtc    8040
atcctcggca ccgtcaccct ggatgctgta ggcataggct tggttatgcc ggtactgccg    8100
ggcctcttgc gggatatcgt ccattccgac agcatcgcca gtcactatgg cgtgctgcta    8160
gcgctatatg cgttgatgca atttctatgc gcacccgttc tcggagcact gtccgaccgc    8220
tttggccgcc gcccagtcct gctcgcttcg ctacttggag ccactatcga ctacgcgatc    8280
atggcgacca cacccgtcct gtggatcctc tacgccggac gcatcgtggc cggcatcacc    8340
ggcgccacag gtgcggttgc tggcgcctat atcgccgaca tcaccgatgg ggaagatcgg    8400
gctcgccact tcgggctcat gagcgcttgt ttcggcgtgg gtatggtggc aggccccgtg    8460
gccgggggac tgttgggcgc catctccttg catgcaccat tccttgcggc ggcggtgctc    8520
aacggcctca acctactact gggctgcttc ctaatgcagg agtcgcataa gggagagcgt    8580
cgaccgatgc ccttgagagc cttcaaccca gtcagctcct tccggtgggc gcggggcatg    8640
actatcgtcg ccgcacttat gactgtcttc tttatcatgc aactcgtagg acaggtgccg    8700
gcagcgctct gggtcatttt cggcgaggac cgctttcgct ggagcgcgac gatgatcggc    8760
ctgtcgcttg cggtattcgg aatcttgcac gccctcgctc aagccttcgt cactggtccc    8820
gccaccaaac gtttcggcga gaagcaggcc attatcgccg gcatggcggc cgacgcgctg    8880
ggctacgtct tgctggcgtt cgcgacgcga ggctggatgg ccttccccat tatgattctt    8940
ctcgcttccg gcggcatcgg gatgcccgcg ttgcaggcca tgctgtccag gcaggtagat    9000
gacgaccatc agggacagct tcaaggatcg ctcgcggctc ttaccagcct aacttcgatc    9060
```

Page 43

```
actggaccgc tgatcgtcac ggcgatttat gccgcctcgg cgagcacatg gaacgggttg    9120
gcatggattg taggcgccgc cctatacctt gtctgcctcc ccgcgttgcg tcgcggtgca    9180
tggagccggg ccacctcgac ctgaatggaa gccggcggca cctcgctaac ggattcacca    9240
ctccaagaat tggagccaat caattcttgc ggagaactgt gaatgcgcaa accaaccctt    9300
ggcagaacat atccatcgcg tccgccatct ccagcagcca cacgcagcgc atctcgggca    9360
gcgttgggtc ctggccacgg gtgcgcatga tcgtgctcct gtcgttgagg acccggctag    9420
gctggcgggg ttgccttact ggttagcaga atgaatcacc gatacgcgag cgaacgtgaa    9480
gcgactgctg ctgcaaaacg tctgcgacct gagcaacaac atgaatggtc ttcggtttcc    9540
gtgtttcgta aagtctggaa acgcggaagt cagcgccctg caccattatg ttccggatct    9600
gcatcgcagg atgctgctgg ctaccctgtg gaacacctac atctgtatta acgaagcgct    9660
ggcattgacc ctgagtgatt tttctctggt cccgccgcat ccataccgcc agttgtttac    9720
cctcacaacg ttccagtaac cgggcatgtt catcatcagt aacccgtatc gtgagcatcc    9780
tctctcgttt catcggtatc attaccccca tgaacagaaa ttccccctta cacggaggca    9840
tcaagtgacc aaacaggaaa aaaccgccct taacatggcc cgctttatca gaagccagac    9900
attaacgctt ctggagaaac tcaacgagct ggacgcggat gaacaggcag acatctgtga    9960
atcgcttcac gaccacgctg atgagcttta ccgcagctgc ctcgcgcgtt tcggtgatga   10020
cggtgaaaac ctctgacaca tgcagctccc ggagacggtc acagcttgtc tgtaagcgga   10080
tgccgggagc agacaagccc gtcagggcgc gtcagcgggt gttggcgggt gtcggggcgc   10140
agccatgacc cagtcacgta gcgatagcgg agtgtatact ggcttaacta tgcggcatca   10200
gagcagattg tactgagagt gcaccatatg cggtgtgaaa taccgcacag atgcgtaagg   10260
agaaaatacc gcatcaggcg ctcttccgct tcctcgctca ctgactcgct gcgctcggtc   10320
gttcggctgc ggcgagcggt atcagctcac tcaaaggcgg taatacggtt atccacagaa   10380
tcagggggata acgcaggaaa gaacatgtga gcaaaaggcc agcaaaaggc caggaaccgt   10440
aaaaaggccg cgttgctggc gtttttccat aggctccgcc ccctgacga gcatcacaaa   10500
aatcgacgct caagtcagag gtggcgaaac ccgacaggac tataaagata ccaggcgttt   10560
ccccctggaa gctccctcgt gcgctctcct gttccgaccc tgccgcttac cggatacctg   10620
tccgcctttc tcccttcggg aagcgtggcg ctttctcata gctcacgctg taggtatctc   10680
agttcggtgt aggtcgttcg ctccaagctg ggctgtgtgc acgaaccccc cgttcagccc   10740
gaccgctgcg ccttatccgg taactatcgt cttgagtcca acccggtaag acacgactta   10800
tcgccactgg cagcagccac tggtaacagg attagcagag cgaggtatgt aggcggtgct   10860
acagagttct tgaagtggtg gcctaactac ggctacacta gaaggacagt atttggtatc   10920
tgcgctctgc tgaagccagt taccttcgga aaaagagttg gtagctcttg atccggcaaa   10980
caaaccaccg ctggtagcgg tggttttttt gtttgcaagc agcagattac gcgcagaaaa   11040
aaaggatctc aagaagatcc tttgatcttt tctacggggt ctgacgctca gtggaacgaa   11100
aactcacgtt aagggatttt ggtcatgaga ttatcaaaaa ggatcttcac ctagatcctt   11160
ttctagataa tacgactcac tata                                          11184
```

```
        <210> 15
        <211> 21
        <212> DNA
        <213> Artificial Sequence

        <220>
        <223> Primer

        <400> 15
agtatcgtgg tagagagctg c                                                     21

        <210> 16
        <211> 36
        <212> DNA
        <213> Artificial Sequence

          <220>
        <223> Primer

        <400> 16
taatacgact cactataggg atgtggctgg agatgc                                     36
```